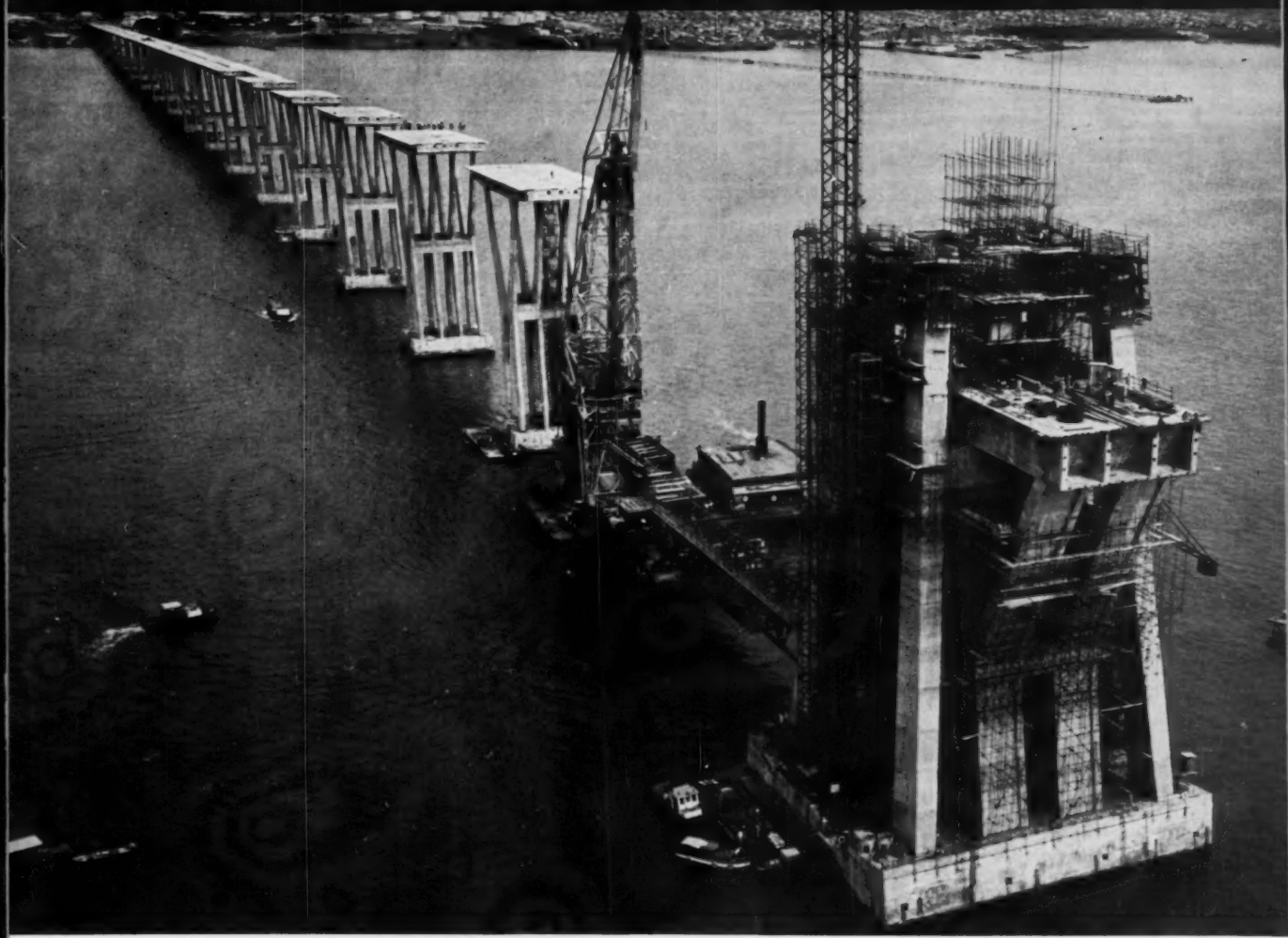
ENGINEERING NEWS-RECORD



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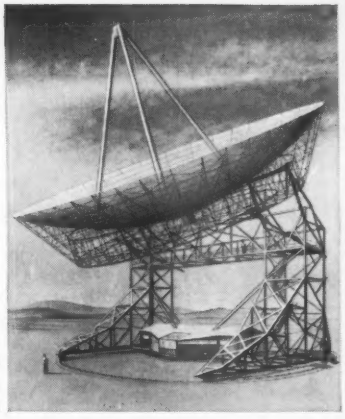

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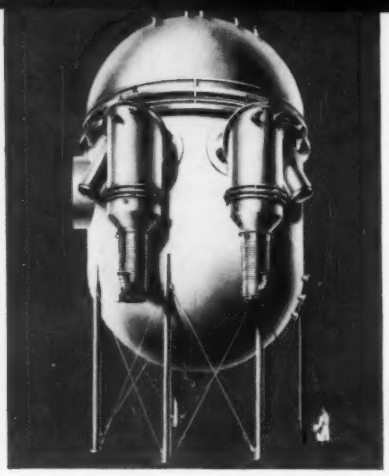

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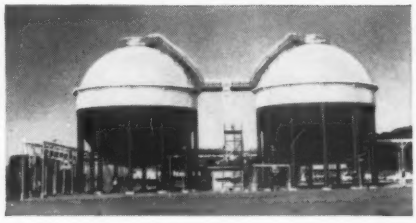

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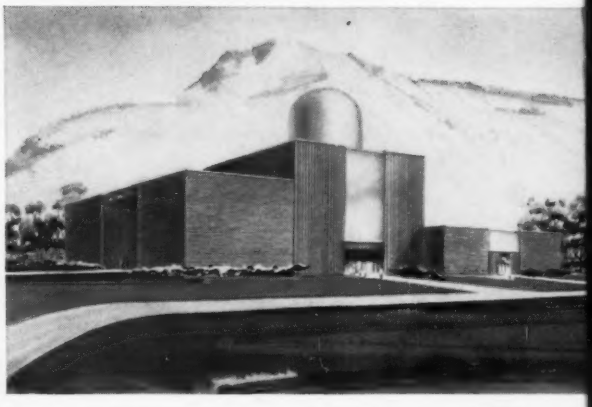

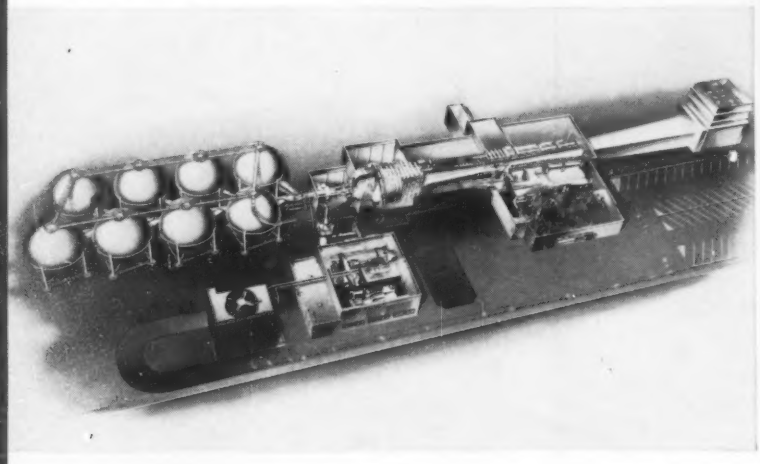

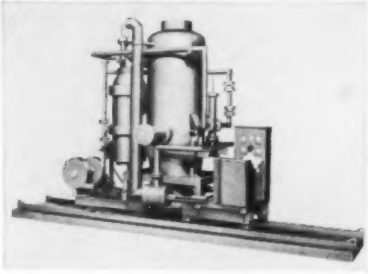

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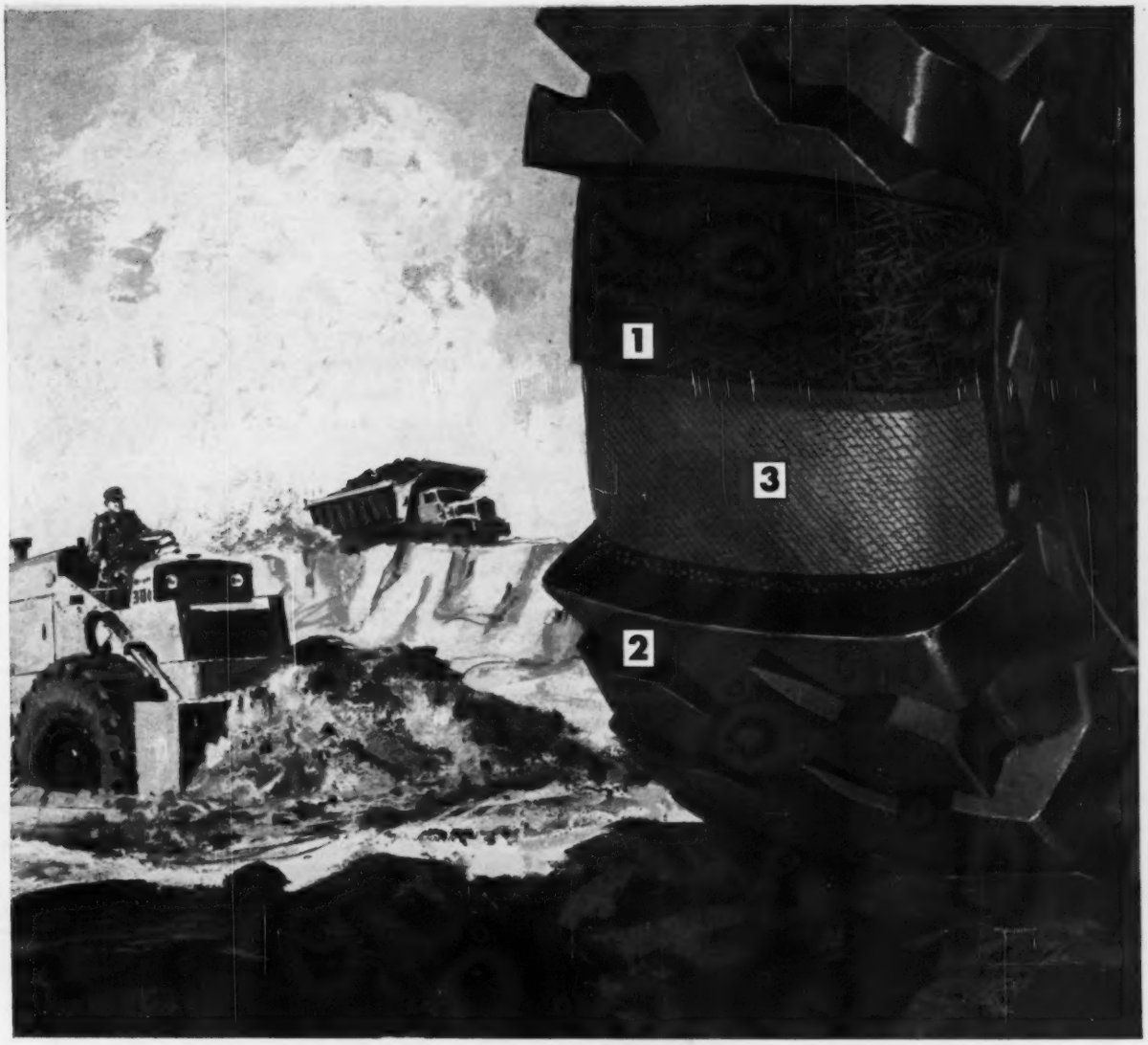

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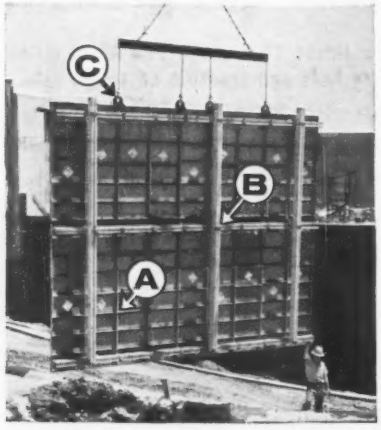

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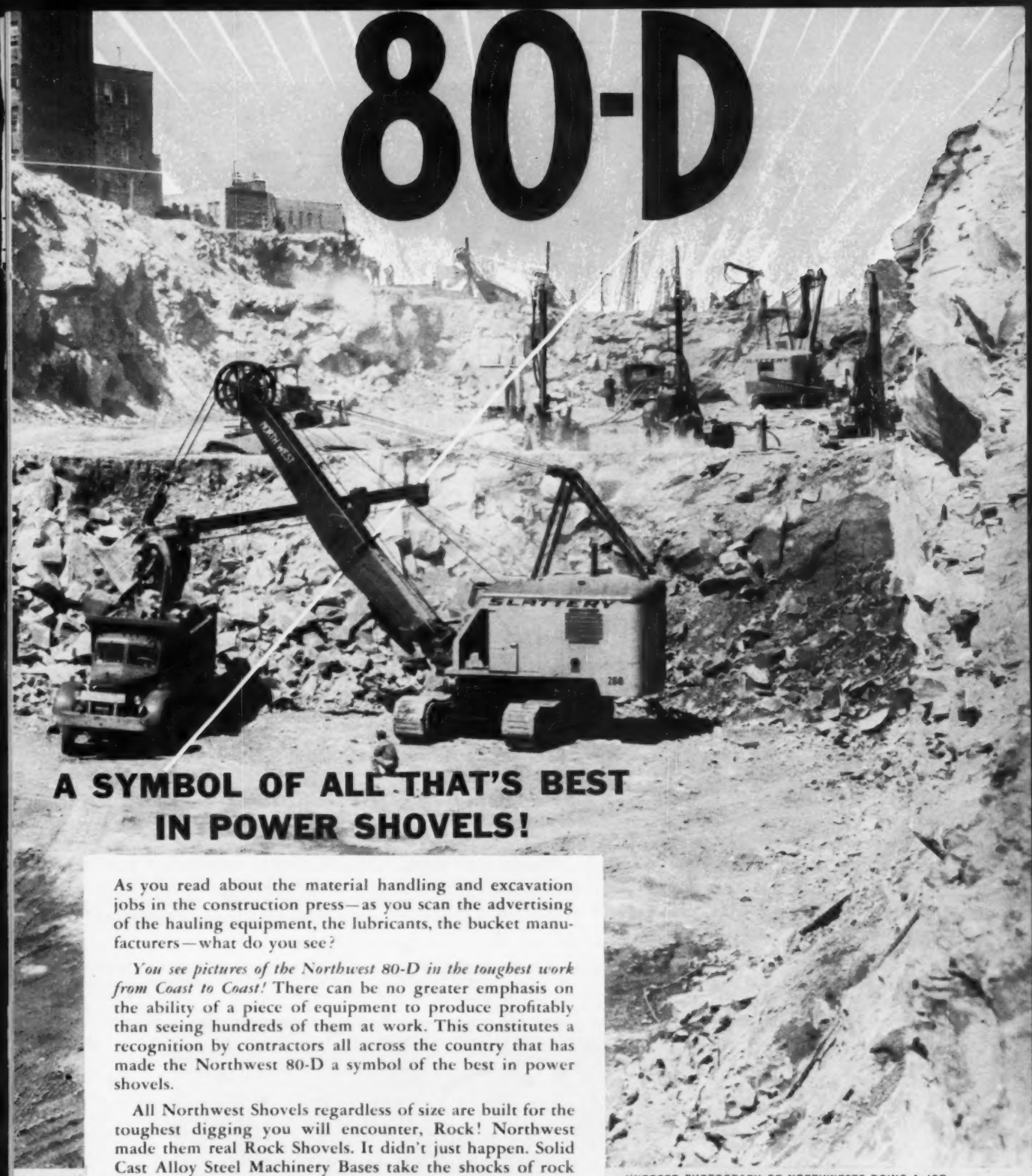

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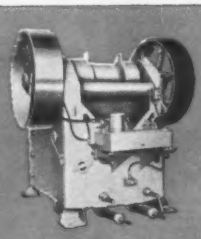

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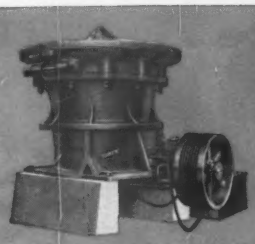

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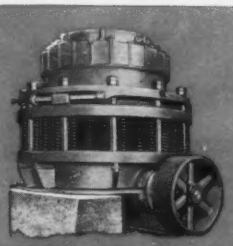

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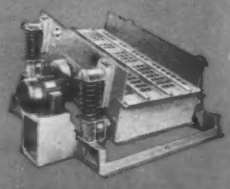

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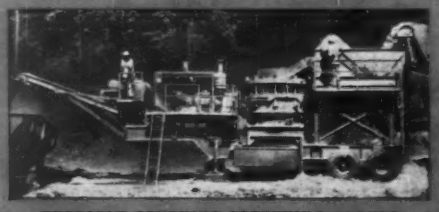

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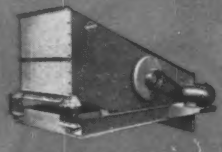

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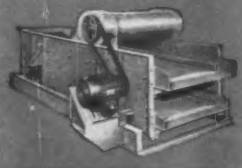

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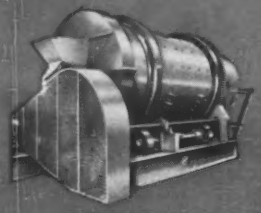

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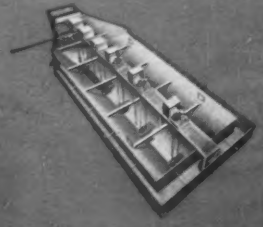

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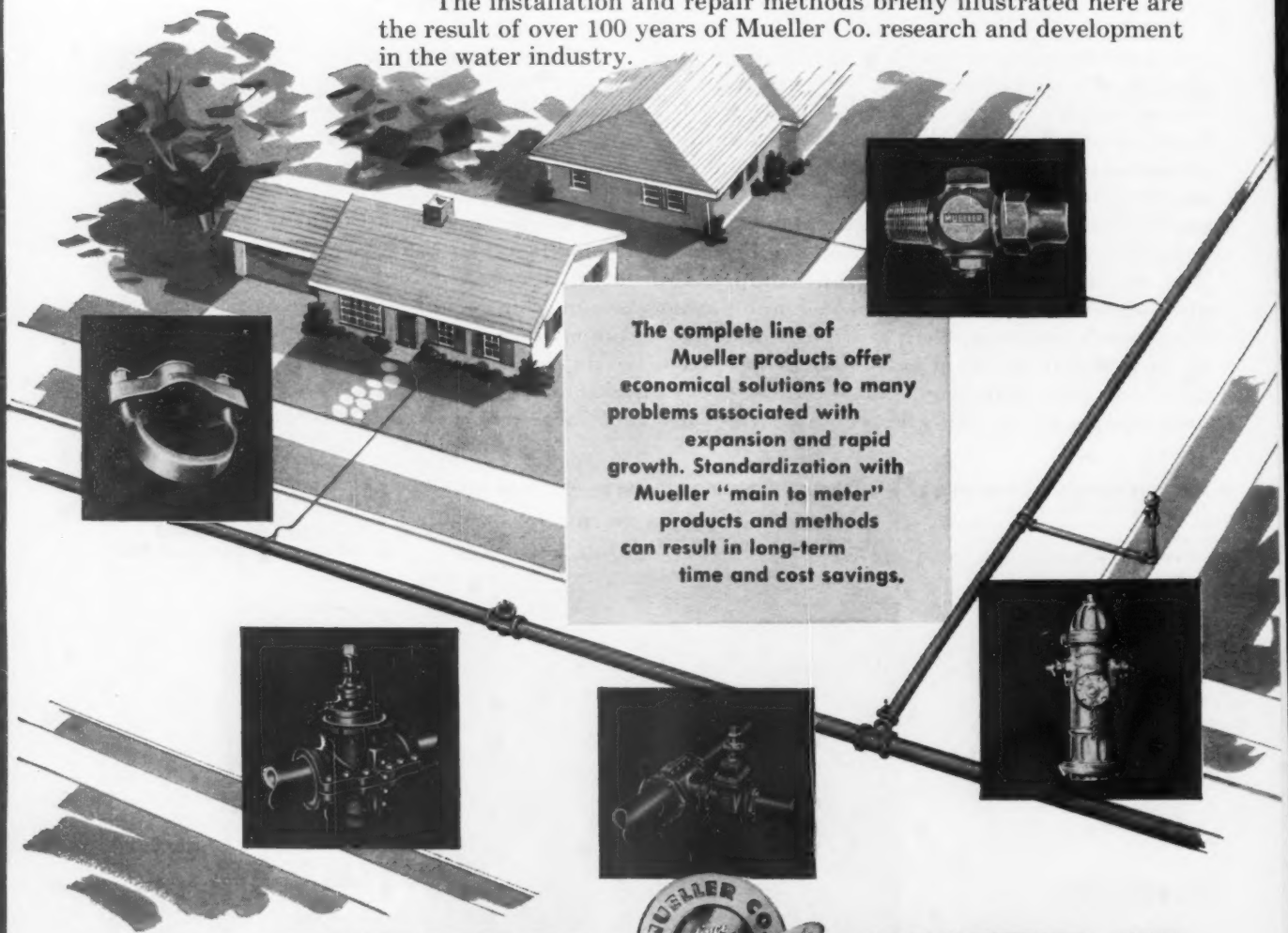
The installation and repair methods briefly illustrated here are the result of over 100 years of Mueller Co. research and development in the water industry.



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Making service connections with Mueller B-100 Machine and Mueller Corporation Stop.

Lower section of machine is secured to main. Boring bar assembly with drilling and tapping tool is assembled to lower section.

Main is drilled and tapped in one operation. Boring bar assembly is removed and tool is replaced by corporation stop. Machine is reassembled and corporation stop is inserted.

Machine is removed and service connection is made.

Installing Mueller Corporation Stop to thin walled pipe with Mueller E-4 Machine and Mueller Service Clamp.

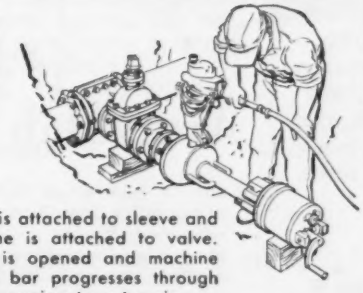
Service clamp is secured to main. Corporation stop is securely threaded into service clamp.

With stop in open position, machine is attached to stop. Tool passes through stop and drills main. Drill is retracted — stop is closed.

Machine is removed and service piping is secured to stop. Stop is opened to activate service.

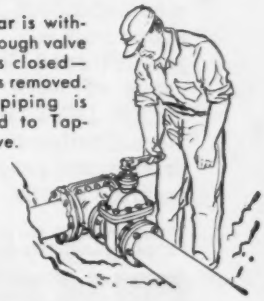
Adding a lateral connection under pressure with Mueller Tapping Sleeve and Valve and Mueller CL-12 Machine.

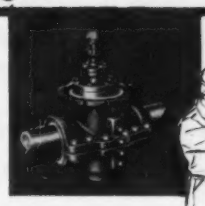
Tapping sleeve sections are secured to main to provide valve connection and to strengthen main.



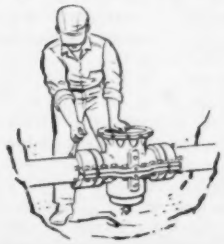
Valve is attached to sleeve and machine is attached to valve. Valve is opened and machine boring bar progresses through valve opening to cut main.

Boring bar is withdrawn through valve —valve is closed— machine is removed. Lateral piping is connected to Tapping Valve.

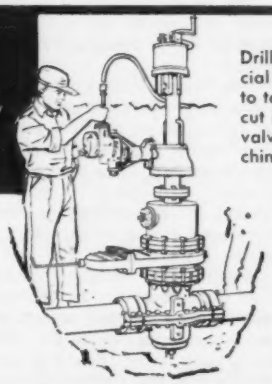




Adding Gate Valve Control under pressure with Mueller Inserting Valves and Mueller CL-12 Machine.



Valve sleeve halves are secured to main to provide strong valve body at point of needed control.

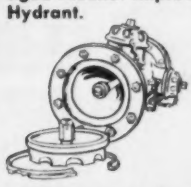


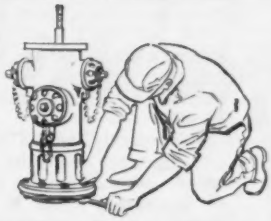
Drilling machine with special slide valve is secured to top of valve sleeve and cut is made in main. Slide valve is closed and machine removed.

Inserting adapter is secured to slide valve. Drilling machine secured to adapter then inserts gate valve assembly through adapter into valve body.

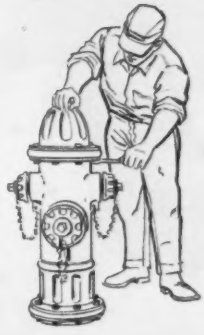
Fast repair of traffic damaged Mueller Improved Fire Hydrant.

Special safety flange has prevented breakage of barrel—special safety coupling has prevented damage to the stem. Both snap off on impact above ground with no loss of water.





With a simple safety flange repair kit, the damaged parts are replaced and the hydrant reassembled.



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It's Not a Speed Sign After All

SIR—Accompanying the article, West Gemany: Where Construction Is Booming (ENR Aug. 10, p. 32) is a photograph with the caption, "Speed signs differentiate between cars and military tanks." The sign shown is not a speed limit sign but a military bridge classification sign. While none can be seen in the picture, the sign is posted by a culvert or small bridge.

Incidentally, military bridge classification signs are no novelty here in Germany. Nearly every bridge and culvert has been classified and posted in accordance with standardization agreements of NATO.

WALTER S. MEDDING, CAPT.,
Corps of Engineers
U.S. Army

Editor's Note—Captain Medding's correction is appreciated. The figures on the sign can most accurately be described as index numbers to a structure's load carrying capacity. Similar numbers are also printed on every heavy military vehicle. If a vehicle's number is the same or lower than the bridge or culvert number, it can safely use the structure.

Army Man Defends Fort Land Swap

SIR—In your article on the Narrows Bridge (ENR June 29, p. 24) and your subsequent editorial (ENR July 6, p. 96) you published comments which reflect adversely upon the Army and the federal government and which are based on misconception.

The issues here involved are not related to the bridge itself, which is doubtlessly a worthy and much needed project.

The bridge was originally planned, and a permit was issued by the Army, for construction on privately owned land north of Forts Hamilton and Wadsworth. A mass public protest developed, particularly from Brooklyn families faced with displacement, which threatened the entire project.

The Triborough Bridge and Tunnel Authority then sought permission to build the bridge with its abutments and approaches on government land within the forts. According to the TBTA this would save more than $40 million in construction and right-of-way costs and would save 1,700 families from displacement. In a letter dated Nov. 8, 1954, the TBTA said: "It is our considered opinion that the bridge and approaches cannot be built unless it can be shifted to the location within the forts."

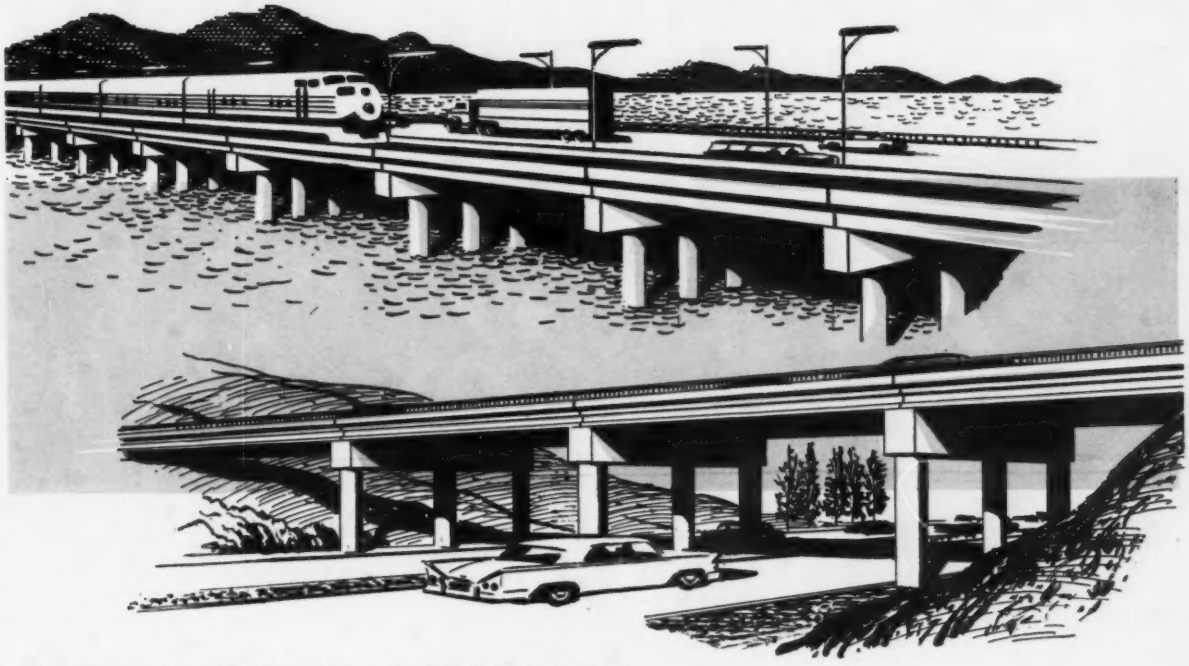
Subsequently the TBTA entered into an agreement with the Army under which land required for the bridge and its approaches would be given to the TBTA at no cost, provided the Authority would replace demolished military facilities that were needed. Replacement structures were to meet current Department of Army standards—which are minimal in all respects. For housing, the Army standards generally conform to FHA minimums and to those of New York City low-cost housing. Had the TBTA desired, it could have sponsored more favorable legislation. This it chose not to do.

Now, many large, commodious brick residences are being replaced with far less commodious row-type houses, and Army occupants do not consider themselves bettered by the change. In fact, the Army lost 71 permanent masonry buildings, 38 permanent wooden buildings and 100 temporary buildings. In their place the TBTA is providing 74 permanent buildings of brick or brick veneer. And although the TBTA has been very cooperative, the construction work has seriously dislocated and impaired Army functions.

I wish to express my disappointment over your having effected a national release of a derogatory nature without first having heard both sides of an issue.

(Reader comment continued p. 14)

Engineering News-Record welcomes expression of opinions from its readers. Comment should be as brief as possible and pertinent to subjects of current construction importance. Letters should be addressed Editor, Engineering News-Record, 330 W. 42nd St., New York 36, N. Y.



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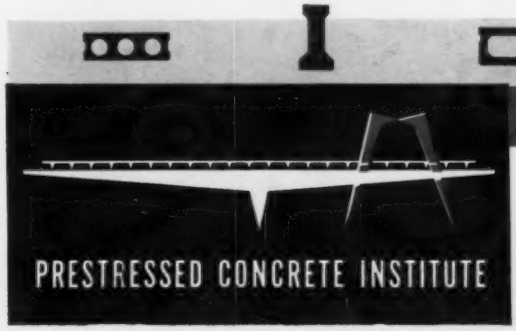

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To arrange for a demonstration, and obtain facts on the John Deere Credit Plan and long-term leasing, see your dealer. Check the yellow pages.

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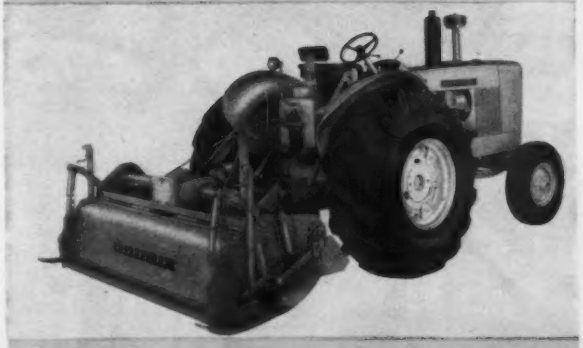
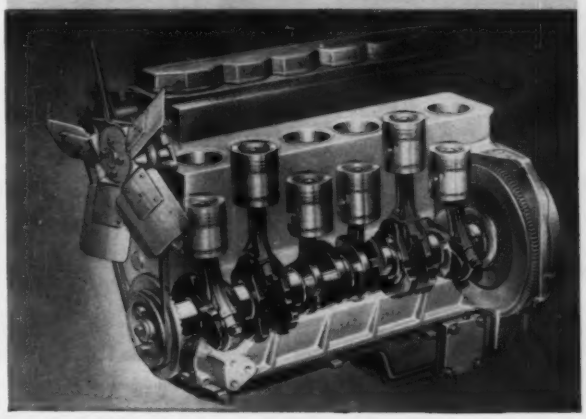


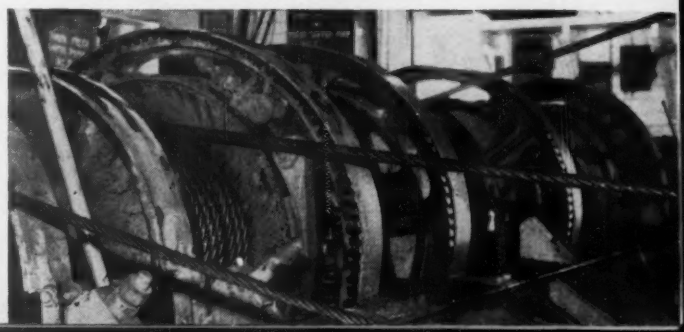


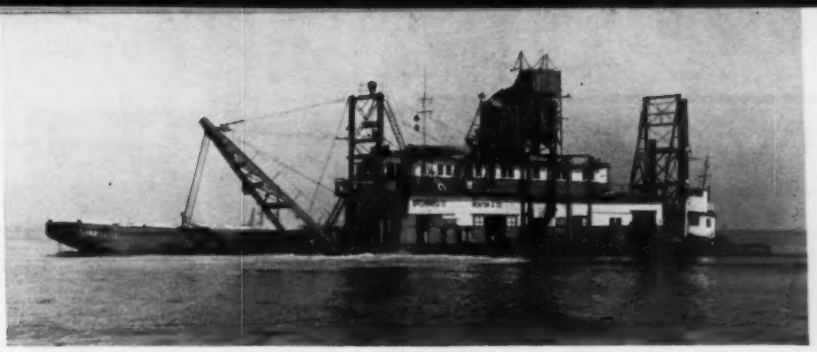
JOHN DEERE LOADERS BULLDOZERS BACKHOES AND EARTHMOVING EQUIPMENT

JOHN DEERE

USS Tiger Brand Wire Rope on cutter hoist operates in muck and salt water and is designed for severe service.

Various hoists rigged with USS Tiger Brand 6x19 Wire Rope for its ability to stand up under the most severe service conditions.





Digging sea shells for Florida highway construction is no child's play. It takes a wire rope with plenty of guts to help keep costs low. USS Tiger Brand does the job.

Tiger on the Spot at St. Petersburg, Florida

Dredge sucks muck and sea shells ... a tough job for wire rope

Digging sea shells for highway construction in Florida may sound like an easy job ... but dredge operators will tell you it's one of the *toughest* there is on wire rope.

On any dredge of the type shown here, the hardest work is performed by the swing lines. These are attached to anchors placed on each side and slightly forward of the dredge. By applying power to one swing line while the other is slacked, the forward end of the dredge is swung in an arc in order to move the cutter head and suction constantly into new bottom material.

At the rear end of the dredge, you will notice two tall pipes supported in a vertical plane by an H frame. These are the spuds, one of which is lowered onto the bottom and acts as a pivot for the swinging action of the dredge.

The wire ropes for the swing lines and ladder hoist work constantly in and out of salt water. They are subject to corrosion, abrasion, severe loads, shock and fatigue. Other wire rope uses for spud hoist lines, gauge lines and main stays are less severe.

USS Tiger Brand Wire Rope has been used for all these applications in various diameters from 1½ inches down to ⅜ inch. Most of the ropes are of 6x19 construction Excellay Monitor with wire core or fibre core depending on the use.

Two dredges operate in this area: the *Broward II* owned by Benton & Co., is digging shells; the R. C. Huffman Construction Co. operates a similar dredge called *Number Three* which is filling in land for a new jet runway for the St. Petersburg International Airport. USS Tiger Brand Wire Rope for each dredge was supplied by the Gulf Coast Industrial Supply Co., St. Petersburg, Florida.

For more information, see your local Tiger Brand Distributor or write American Steel and Wire, Dept. 1232, Rockefeller Building, Cleveland 13, Ohio. *USS and Tiger Brand are registered trademarks*

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. . . Reader Comment

Furthermore, I feel that a national engineering magazine is hardly the vehicle to advocate that federal lands should be "free-issue" for every local project, however worthy, which cannot subsist on its own merits.

CHARLES K. PANISH
Norwalk, Conn.

Editor's Note—ENR neither claimed nor intended to imply that federal lands should be "free-issue" for local projects. We intended to point up that the Army made a pretty good deal in giving land and getting new buildings in the Narrows Bridge right-of-way agreement. Both sides were heard. Army spokesmen, for the most part, expressed pleasure with the deal, despite the claim of Reader Panish (who is Chief, Engineering Division, Corps of Engineers, New York District). TBTA spokesmen were not nearly so happy.

Bigger Bucket Yet

SIR—In reading your article—Big Bucket Holds 35 Cu Yd (ENR May 25, p. 52)—I was a little astonished to find that the big bucket has a rated capacity of only 5½ tons. It appears to me that it should have a capacity of 52 tons, using a figure of 1½ tons per cu yd as my basis. Have I miscalculated?

A. S. ANGELL
U. S. Coast Guard
Long Beach, Calif.

Editor's Note—No, you're right. The drag bucket has a rated capacity of 52½ tons.

Any Failures to Discuss?

SIR—The first paragraph of your excellent editorial, Learning From Failures (ENR Aug. 10, p. 92) emphasized the important point that people generally are very reluctant to discuss construction failures with which they have been involved.

In an attempt to gain knowledge from foundation failures, the Soil Mechanics and Foundations Division of the Illinois Section, ASCE, of which I am chairman, mailed a request to the entire Illinois section membership to send in any information they might have.

The Division has now held a meeting devoted to the frank discussion of several projects in which the original designs did not accomplish the intended objectives, and could be considered as unsuccessful if not failures. The professional manner in which the subjects were presented and the audience response have encouraged us to continue this quest for information.

If any of your readers in this area have information on foundation failures, we should greatly appreciate hearing about them.

DAVID NOVICK
Chicago, Ill.

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Gears made from carburized and hardened 4620 develop a strong, tough core beneath a hard case... withstand compressive loading up to 210,000 psi.

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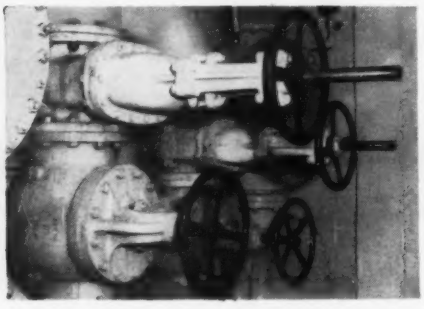

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THE CONSTRUCTION WEEK

THE FIRST FRAME—Bethlehem Steel Co. workers placed the first steel for the 690-ft towers of New York's Narrows Bridge this week, a 47-ton frame on the Staten Island foundation. The $325-million bridge will have the world's longest suspended span, 4,260 ft.

A SLAP FROM ESTHER—The first tube section to be sunk on the Chesapeake Bay Bridge-Tunnel project (ENR Sept. 14, p. 17) wound up in drydock instead of at the bottom of the bay. A victim of Hurricane Esther's sideswipe at the Virginia coast, the 270-ft-long tube will be repaired in the U. S. Naval Shipyard at Portsmouth. Repairs are expected to take about a week.

REASONABLE, ISN'T IT?—President Kennedy's Missile Sites Labor Commission ruled last week that an eight-hour show-up pay clause in a labor contract covering machinists at Vandenberg Air Force Base, Calif., "does not constitute an uneconomical practice." The provision is not unreasonable, because it does not apply when there is no work due to reasons beyond management's control, the Commission said, and it is intended "to prevent poor work scheduling by management."

B. C. GOING INTO CONSTRUCTION?—The government of British Columbia is negotiating with building trades unions as a prelude to building the $610-million Peace River hydro development by its own forces. Two months ago the B. C. government nationalized two private firms—the B. C. Electric Co. and the Peace River Power Development Corp. (ENR Aug. 17, p. 26).

TOGETHERNESS REVISITED—The U. S. and the U. S. S. R. are discussing plans to build jointly the world's largest nuclear accelerator, capable of developing 500 to 1,000 billion electron volts (bev). The biggest nuclear accelerator, at Brookhaven, L. I., can produce 30 bev. In addition to atom-smashing work, the two powers are also seeking to cooperate in radioactive waste disposal and fast reactors.

MORAL: IN MILWAUKEE DRINK BEER—Pink stuff flowing from Milwaukee faucets last Sunday didn't look like water or beer, so several citizens complained. Water Department investigators found that with flawless timing (it was opening day for the Water Pollution Control Federation's annual convention in Milwaukee), 300 gal of permanent anti-freeze being dumped from one tank to another by a trucking company found its way via a forbidden cross connection into the city water mains. The city flushed it out by opening hydrants.

GRIFFIN **Solves Another Dewatering Problem!** To build 11 double piers for the Chicago-to-St. Paul Expressway Bridge over the fast-flowing Wisconsin River, contractor procedure called for constructing three earth cofferdams in the coarse sand, gravel and boulders of the river . . . Typical of construction speed was the progress made in only 10 weeks in the cofferdam shown above: • Construct cofferdam—2 weeks • Install Wellpoint system and dewater to grade—one week • Excavate, drive piles and pour concrete up to river level—7 weeks.

Further proof of time and money saving advantages of Griffin Wellpoint planning, supervision and equipment.

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WASHINGTON OBSERVER

- **Pentagon will reconsider landlord role**
- **The congressional eye is on aluminum**
- **A fallout shelter for every backyard?**

● **A reappraisal of the military family housing program is in the works.** By November 15 a Defense Department panel, headed by Deputy Secretary Roswell L. Gilpatric, will come up with a comprehensive report including recommendations on military housing requirements, standards, financing, management and a legislative program for next year. A variety of civilian experts in financing, marketing, construction and management of real estate serve on the panel with Mr. Gilpatric.

An important object of the panel is to determine whether federal-financed construction is justified, rather than dependence on Capehart housing, which is privately financed. There was a great deal of criticism of Capehart housing in the recent session of Congress. In this respect, the panel will try to determine the extent to which the Defense Department should provide housing for military and essential personnel, and will make a forecast of military housing requirements for the next three years.

—

● **The Senate antitrust and monopoly subcommittee is conducting a preliminary investigation of the aluminum industry.** It has issued subpoenas for documents to some 20 smaller companies—mostly fabricators and extruders who process aluminum for a variety of construction uses. Major primary metal producers—Alcoa, Kaiser and Reynolds—haven't received subpoenas, but it seems unlikely they will escape the subcommittee's scrutiny for long.

The subcommittee is interested in two phases of the industry: prices, and the extent of activity of primary producers in fabricating. The Justice Department's antitrust division already has antimerger suits pending against primary metal producers acquiring fabricators. Subcommittee staff members say the current inquiry is intended to determine if a full-scale committee investigation is called for.

—

● **The Office of Saline Water has called for bids to construct its fourth saline water demonstration plant.** This will be the one-million gallon per day brackish water conversion plant at Roswell, N. M. Bids, to be opened December 5, will include construction of a forced-circulation, vapor-compression distillation plant along with an operating building, facilities and technical services for a 75-day test period. This is the fourth of five scheduled government demonstration units. But with $12.5 million a year to spend for research under the new saline water bill OSW will be planning other demonstration plants to test other processes in the near future.

—

● **The Pentagon is working on plans to bring fallout shelters within the price range of most Americans.** The idea revolves around a minimum backyard dugout, reinforced with earth, sandbags and perhaps even cinder blocks. Cost, to be carried by the homeowner, would run between $100 and $150. Such a shelter would, of course, be effective only against nuclear fallout at a considerable distance from the blast. And no more than three or four persons could survive in the cramped quarters for a limited time. President Kennedy ordered the study because most fallout shelters currently under discussion are out of the financial reach of the great mass of Americans.

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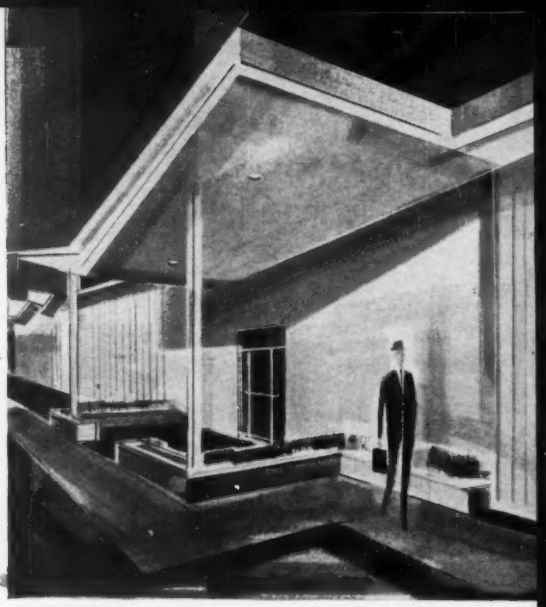
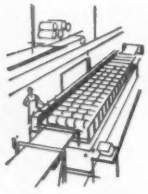


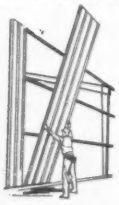
PRE-ENGINEERING. Designing a Butler building is simply a matter of selecting the correct, pre-engineered components. Routine engineering is eliminated . . . saving your engineers' and executives' time. Saving you money.



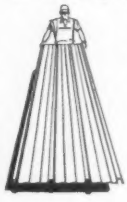
FACTORY FABRICATION. Automatic welding, shearing and gang punching are done to precise specifications—under rigid quality control. The result is a beautiful building . . . an end product that is better in every detail.

TENACIOUS FASTENERS. Experts agree, there is no such thing as a quality metal building *without* quality fasteners to keep it weathertight. That's why Butler uses costly, self-clinching rivets—machine driven to grip with 1,400 lbs. pressure.

INTEGRAL ALUMINUM SASH in all three wall systems. The smooth, satiny look of maintenance-free aluminum. The smooth fit of factory-fabricated components. There's no sloppy field-cut, field-installed flashing.



SPEEDY CONSTRUCTION. Erection is so simple, Butler buildings go up weeks, even months faster. You're in your new building sooner, doing business sooner. You save time and construction cost, without sacrificing quality.



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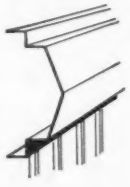

NEW TRIM. New gable and eave trim gives Butler buildings a crisp, finished look—beautiful contemporary lines. This new trim has a pleasing, two-tone finish that harmonizes with any color, any collateral material.

MORE OF YOUR WANTS, NEEDS, LIKES. There are 6 structural systems, 7 design loads, 4 bay lengths, 6 sidewall heights. You get the size building you want. And you get the type of building you want. No compromises.

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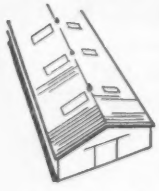

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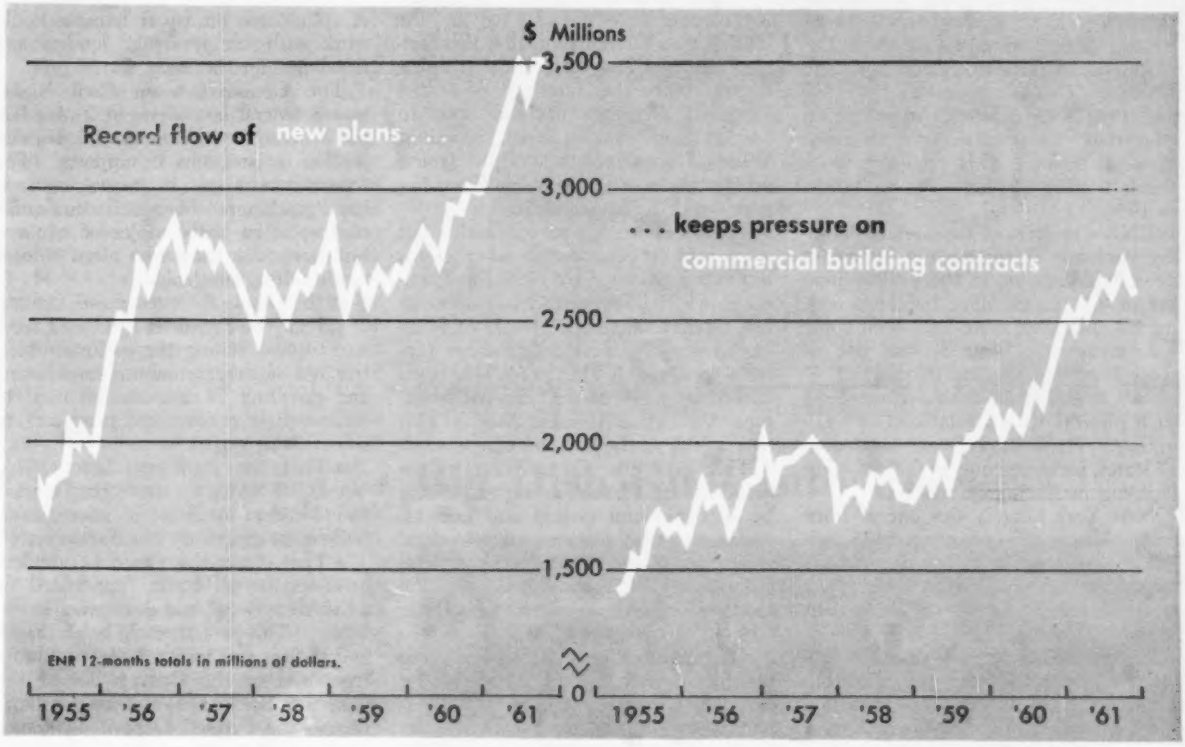


In private construction . . .

Commercial Grows the Fastest

Commercial building is the standout performer of the private heavy construction market in 1961.

It's growing the fastest and has been since the late Fifties. In fact, it's the only major component of private work that's following a growth trend this year.

New plans are up sharply. Contract awards are also setting an all-time high. Moreover, there is much more growth to come. Contracts should rack up a hefty increase and new record in 1962, as projects that poured on the drawing boards this year pass through the planning stage into construction contract status.

The strong uptrends in new commercial building design volume and contract awards have defied two recent threats—the 1957-58 economic recession and the prolonged 1959 steel strike. And they barely took notice of the mild 1960-61 economic slowdown.

The stubbornly bullish behavior of commercial building contrasts sharply with industrial building and—with respect to the 1957-58 recession and 1960-61 slowdown—to private mass housing. Both of these kingpins of the private construction market got hurt. Their trends have actually been down for over a year, with industrial building running far under its record 1956 pace.

One reason for commercial building's outstanding performance is that the pressure of demand has increased so much. It won't permit much of a slowdown in the contract uptrend. New proposed work has piled up much faster than contract awards (see charts).

Another reason is the diversification within the rather broad category of commercial building. Most of the dollar volume reported by ENR represents office buildings, stores, shopping centers, private college buildings and hospitals.

Office building construction appears to be far from catching up with pent-up demand for modern office space. A good many large cities have only one new major office building since the Thirties; New York City has added scores but still hasn't caught up with demand.

Shopping center construction tends to follow after a considerable lag the ups and downs of the mass housing market. The late 1961-62 rebound in mass housing volume forecasts a renewed vigor in shopping center construction by late '62.

Private school construction, chiefly college and university projects, is expanding. This category and office building are the mainsprings of commercial building's uptrend. Just as the Fifties saw a boom in elementary school construction and the late Fifties launched a sharp rise in secondary school construction, we are in the early stage of a strong uptrend in college building.

Helping to supply needed capital to finance expanding college construction is the Community Facilities Administration of the Housing and Home Finance Agency. Its program of low-interest college housing loans is backing hundreds of new projects a year—dormitories, dining halls, student unions and other service buildings. These loans have averaged a little more than $1 million each, and use is up sharply. Whereas $1.6 billion in loans was ap-

proved in the past 10 years, in only the first eight months of 1961 CFA OK'd 254 loans totaling $294 million.

Construction of college and university facilities, public and private, is running about 17% higher this year than three years ago, according to estimates of the Office of Education, Department of Health, Education and Welfare. The OE estimates the 1960 and 1961 annual rate of new "higher education" construction put in place at $1.2 billion. This compares with the last official figure of $1.03 billion in 1958.

ENR's analysis of commercial building contracts shows what a big factor office buildings are in the healthy market of '61. Large office buildings costing $3 million or more have been going to contract this year at the rate of three every two weeks. In the first 40 weeks of this year, ENR reported 61 such projects with a total cost of $479 million. These projects are located in 17 states, including one $4-million office building in Anchorage, Alaska.

New York City is way out in front with 15 new offices costing $125 million. Los Angeles has nine projects valued at $90 million, including two office buildings in its Beverly Hills suburb. Houston, Tex., has five office buildings already with a value of $46 million. Denver, Colo., has four costing a total of $27 million. San Francisco and the District of Columbia each have three projects totaling $12 million. Baltimore, Chicago and Dallas each have two office buildings valued at $3 million or more. Among the other cities which have one major new office building contract so far this year are Cincinnati, Detroit, Phoenix and Kansas City, Mo.

Shopping centers and hospitals are also numerous among the larger commercial projects gone to contract so far this year. The 21 shopping centers costing $3 million-and-up have a total cost of $95 million. They are scattered among 15 different states. California has three, Florida and Colorado each have two. There are only five department stores in this size range, totaling $20 million.

Hospitals of this size number 20 and total $96 million. Chicago claims three of them, Baltimore two.

More than basic need can stimulate the commercial building market. New York City is experiencing a boom in new building plans as architects get their projects on file before a new zoning law goes into effect next January 1. Building permits in August soared 34% over July; the eight months volume is up 56% over last year.

New plans have been announced this year for major projects in 31 communities. New York again tops the list with eight new projects with a total estimated construction cost of $215 million.

Urging broad federal control through banks . . .

Civil Rights Group Moves on

Sweeping recommendations by the Civil Rights Commission that the President issue an Executive Order banning discrimination in housing have put President Kennedy on the spot to "make good" on campaign promises. **What—if anything—the White House decides to do will have a significant impact on U. S. homebuilding.**

The Commission's proposals last week went far beyond any earlier serious recommendations. In 1959 the Commission asked President Eisenhower to ban discrimination in the sale of housing where the federal government supports mortgages—FHA and VA loans backed by the Federal National Mortgage Association (Fannie Mae). This covers 30% of the U. S. housing market.

This time the Commission recommended such a ban in mortgage lending by all banks and savings and loan associations that come under federal supervision, even though the federal government has nothing to do with the mortgages. This would cover another 60% of the housing market.

The Commission's proposal adds to pressure asserted a week earlier by the National Committee Against Discrimination in Housing, a group of 33 religious, labor and civic groups. The group reminded the President that he flatly promised to issue an order prohibiting discrimination in FHA and VA-financed housing if elected.

As far as could be learned this week, the White House has no such order in the works. Because of Mr. Kennedy's unqualified commitment, however, it is considered likely that he will do something this fall.

Whatever the President does will certainly fall far short of the commission's recommendations. First of all, the practical and legal problems of enforcing non-discrimination are enormous. Secondly, the political feelings of powerful Southerners in the House would be assaulted, and Mr. Kennedy already faces trouble enough in the House next session. Thirdly, the President is fearful of any action that might slow down homebuilding, a touchy factor in the economic recovery.

Current thinking among the President's housing and civil rights advisers favors something like a broad policy statement that discrimination must be ended. This might be backed by establishment of a committee like the President's Committee on Government Contracts, which has worked quietly and with some success to get voluntary agreement from employers with big government contracts to hire Negroes. A committee on equal housing could work with big mortgage lenders and developers in the same way.

The Commission on Civil Rights scored federal housing agencies for failure to take any action to end discrimination in programs it supports. The federal government, it charged, supports the "machinery" by which discrimination operates—the complex of bankers, builders and realtors who often enforce unofficial segregation.

It then made three recommendations:

- That the President issue an Executive Order "stating the national objective" of non-discrimination in housing and directing all agencies involved to "shape their policies and practices" to achieve this goal.
- That the President direct FHA, VA and FNMA to assure that lenders and builders dealing in government-backed mortgages do not discriminate.
- That either the President or Congress require all banks "supervised by a federal agency" end discrimination in loans. This would include all banks and savings and loan associations under regulation of the Comptroller of the Currency, the Federal Home Loan Bank Board, the Federal Deposit Insurance

Electric Heating

Utility men took stock of available electric heating devices at a meeting in Washington, D. C., late last month, and they talked about getting more of them into buildings.

It was the Fifth Electric Heat and Heat Pump Conference, sponsored by ELECTRICAL WORLD, a McGraw-Hill publication.

Speakers advised an all-out educational and sales program directed at homebuilders, architects, plumbing and heating contractors and bankers. Charles F. Hochgesang, editor of ELECTRICAL WORLD, urged greater research and marketing efforts on electric heating devices.

New developments in the two basic types—resistance heaters and heat pumps—were discussed.

Ray Edwards, president of Edwards Engineering Corp., Pompton Plains, N. J., described an "electric-hydronic" unit that puts night-time power through high-resistance conductors to heat water. The water is stored in insulated tanks to circulate through a hot-water system during day-time heating hours.

William K. McGrath of Carrier Air Conditioning Co. discussed heat pumps

Homebuilding

Corporation, or the Federal Reserve System.

This last recommendation drew sharp dissent from two of the six commissioners, who view it as an unworkable and unwarranted intrusion of the federal government in private banking.

The feeling of the Commission is that unless conventional mortgage loans are included, builders and developers would move more and more away from FHA-VA financing and into conventional financing. This would depress the housing market and lessen the amount of housing available to Negroes.

Other recommendations by the Civil Rights Commission:

- Communities receiving federal aid in urban renewal be required to find decent housing for persons displaced.
- The Urban Renewal Administration include clauses in contracts with local developers assuring non-discrimination in rents and sales.
- Congress should require states to find adequate housing for those displaced by highway construction under the federal program.
- Federal housing agencies should make studies on the extent of discrimination in the programs they administer.

Seen Set for Push

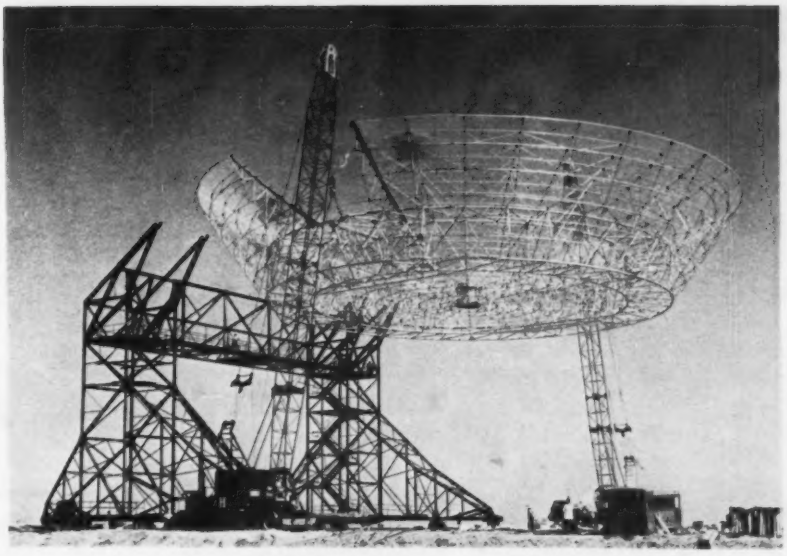
and claimed their installation and servicing is often unreliable; he suggested that utility companies should recommend both equipment and contractors for installing and service.

Here are some recent improvements in heat pump design mentioned by Mr. McGrath.

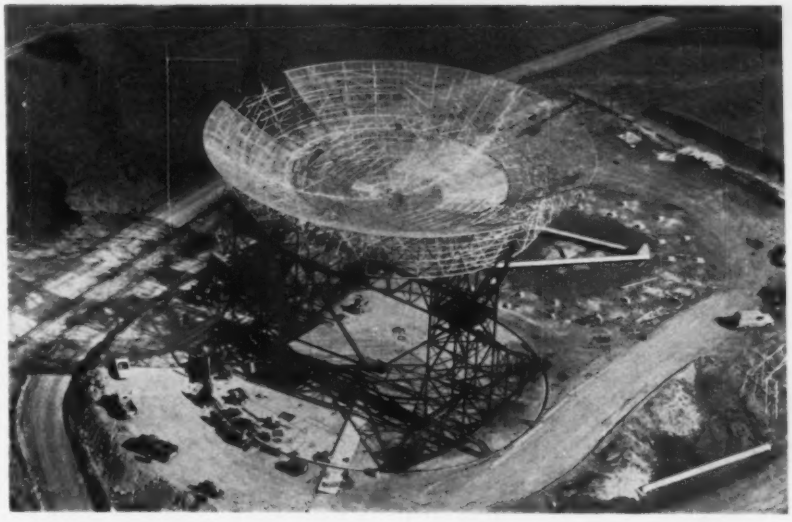
- Better winter efficiency in compressors that are more tolerant of excessive voltage.
- Constant temperature monitoring of the motor, to prevent burnout when a refrigerant leak occurs.
- Better defrost control.
- Complete safety shutdown, for about five minutes, whenever the compressor stops for any reason, to prevent short cycling and subsequent motor damage.
- New models such as wall mounted units, self-contained room-type units, and models with lower noise levels.

Mr. McGrath also pointed out this problem area as open for improvements:

Circuit breaker fusing is so high today (up to 400% of the full-load current) that there is no back-up protection for the heat-pump motor when overloaded. He recommended fusing at 135% to 150% of the full-load current.



Big Dish Goes Into Place as . . .



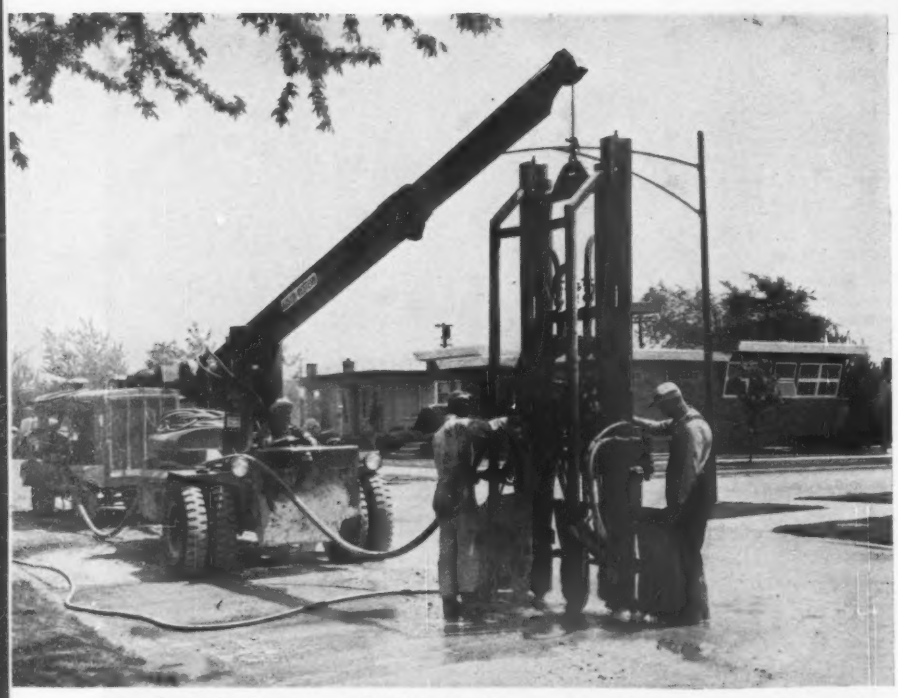
Record Telescope Nears Finish

Two long-boomed cranes gently placed a 70-ton dish antenna on its steel truss cradle support last month at the Stanford University campus. The 150-ft-dia structure, fabricated from tubular aluminum sections, will be the largest active radio telescope in the United States when it finally goes into operation.

Stanford Research Institute scientists, who designed the telescope and its supporting structure, expect to conduct radar and radio explorations of the solar system before the year ends. A huge radio transmitter will supply power for radar probes into space.

The antenna will rotate horizontally on a 136-ft base track and vertically about the cradle axis. The circular rail sits on a reinforced concrete ring foundation that measures 3 ft wide by 4 ft deep.

Pittsburgh Des Moines Steel Co. fabricated and erected the steel supporting structure of the telescope. SOS Steel Co. of Santa Clara fabricated the basic steel pipe ring. Aircraft Engineering & Maintenance Co. of Oakland fabricated the aluminum space trusses for the reflector antenna. Bigge Drayage of San Leandro connected the aluminum trusses to the basic rings, and Dearborn Moving Co. of Dearborn, Mich., erected the antenna.



Rock drills hung on hydraulically operated crane neatly perforate concrete pavement.

To Open: Dig on the Dotted Line

A Chicago pipeline contractor claims he's line drilling concrete pavement ahead of his ditching crews ten times faster than conventional pavement breaking. He uses ganged rock drills suspended from the telescoping boom of a rubber-tired hydraulic crane.

He's not breaking up the pavement at all. The backhoe does that later, knocking out the perforated strip as it excavates the trench. The result is a clean-edged ditch.

Two of these drilling combines are preparing as much as 600 ft of pavement a day as compared with 60 ft a day the contractor says he would average employing conventional methods.

Result: clean-cut ditch.

Contracting & Materials Co., Evanston, Ill., decided on the rock-drilling technique mainly because of the location of this particular pipeline job. The project involves laying 12 miles of 36-in. gas main through one of Chicago's densely populated residential sections, and C&M wanted to avoid as much traffic obstruction as possible. By keeping its pavement drilling operation well ahead of the trenching and pipelaying crews but at the same time not breaking up the pavement, the contractor is keeping traffic disruption and general inconvenience to a minimum.

Both double- and triple-head drill rigs are handled by two rubber-tired hydraulically operated cranes. One is a tricycle unit with a five-ton capacity, the other a four-wheeled machine with a seven-ton rating. The multiple-drill units are standard pipeline rock-drilling equipment normally side mounted on crawler tractors.

Track-mounted rigs were ruled out to avoid damaging the adjoining pavement. The two- and three-ton drill rigs could have been mounted on trucks but this would mean a stationary mounting and C&M wanted flexibility so that when tough sections of pavement were encountered a few holes could be knocked through between the parallel edgelines.

The maneuverable hydraulic cranes were just the ticket. The ganged rock drills are simply suspended on the crane's lifting cable. Thus fingertip positioning is possible with a minimum of vehicle movement.

Each crane drags its own air supply behind it in the form of a trailer-mounted, 900-cfm compressor. Air hoses are draped over the crane cab and forward to the drills. Fire hydrants along the route are tapped for drill-cooling water.

A drill crew consists of a crane operator and one man for each drill head. This team maps out its work with chalk lines on the pavement. The crane holds the drill rigs over the chalk lines and the air-powered rock drills cut 2¼-in.-dia holes 6 in. c-c. The drills average 10 seconds to bore through 4 in. of concrete.

Since the drill rig is suspended from a single cable, drillers can easily swing it around perpendicular to the edgelines and cross-drill pavement that is extra thick or tough.

Another advantage to the rubber-tired operation is the mobility of the cranes. Since there is more than one pipelaying operation going on at one time—sometimes a considerable distance apart—the crews preparing the pavement must move from one to the other. The cranes travel at road speeds and handle well in traffic. The drill rigs are easily detached to free the cranes for other duties (see picture at left).

Alabama Roadbuilders Must 'Buy American'

Imported steel has suffered another major set-back in the South.

A year ago the Southern Building Code Congress called on its members to enforce code requirements that steel conform to specifications of the American Society for Testing and Materials. "What we are doing will have the effect of banning the use of foreign structural steel in 900 southern cities and towns," said the SBC's Executive Director M. L. Clement (ENR Nov. 21, 1960, p. 32).

Now Alabama State Highway Director Sam Engelhardt states that his department has amended its specifications for construction of highways and bridges to require domestic steel as follows:

"All reinforcing steel, wire-mesh steel fabric, wire for all types of fence, steel bearing piles, steel sheetpiling and structural steel that is to be a part of any finished highway or bridge construction shall be rolled, processed, prefabricated and manufactured in the U. S. or its territories or possessions."

Missile Silos Suck Water Say Arkansas Residents

Residents of St. Vincent, Ark., are complaining that Titan II missile silos are causing their wells to run dry. They claim that deep holes being dug for missile launching facilities at nearby Little Rock Air Force Base are drawing away the underground water supply.

The Little Rock District of the Corps of Engineers says that it will investigate the charges. A spokesman for the Corps said it was hoped that when the silos are concreted, the water supply will be re-established—if the silos are causing the shortage in the first place.

ENR Editor's Story Takes Highway Journalism Award

The Ted V. Rodgers journalism awards of 1961, announced this week, include a third award in the magazine category for Joseph F. Wilkinson, assistant managing editor of ENGINEERING NEWS-RECORD. The entry: New Highways Make a Better U. S. (ENR June 22, p. 62).

Trailmobile Inc. and the American Trucking Associations Foundation, Inc., make cash awards each year for articles contributing to "improvement of our highways and their use." Three awards are made in each of three categories—magazines, daily newspapers and weekly newspapers.

First place in the magazine group went to Robinson Newcomb, economist and author, for an article in NATION'S BUSINESS. Mr. Newcomb has been an ENR author in the past.

Code Switch Halts Work on Hotel

The builder of a 22-story hotel in Portland, Ore., has balked at a contract change order requiring him to meet the Los Angeles building code. He wants out of his $6.2-million contract.

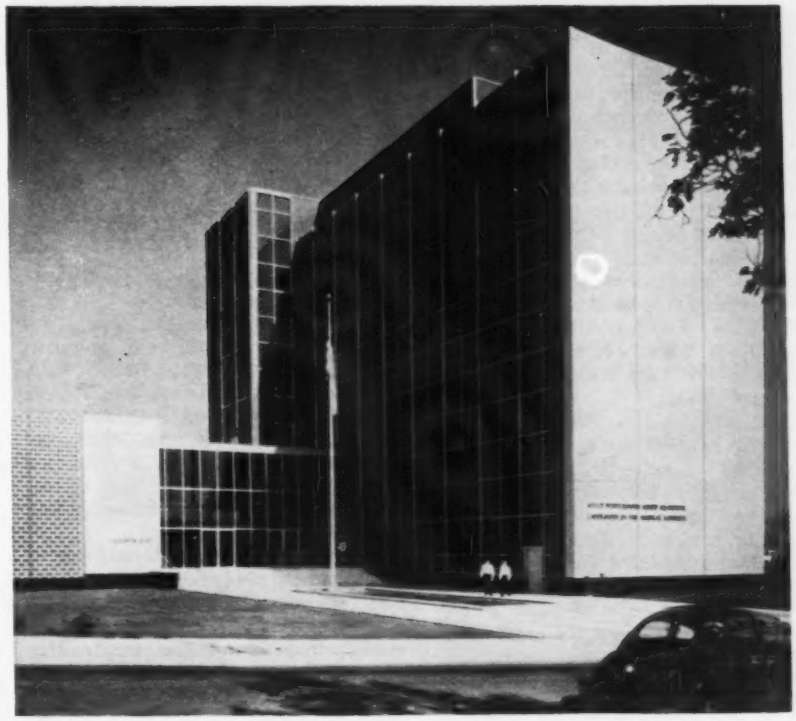
Verbal testimony has ended in the suit of Andersen-Westfall Co. to break its contract with Metropolitan Hotel Corp. of Portland as general contractor for construction of the 501-room Portland Hilton Hotel.

The issue in the suit is whether structural changes ordered after construction started amounted to "unreasonable delay." The question revolves around interpretation of the contract as related to a change order that required structural changes to conform with Los Angeles building code requirements rather than Portland code requirements.

Under the Portland code, elevator and stair shafts may be designed to take lateral forces uniformly distributed over the full height of the building. On buildings over 13 stories high, the Los Angeles code requires moment-resisting frames to carry 25% of the total lateral load. The horizontal load distribution is considered as triangular with the maximum load occurring at the top.

Extra payment was negotiated for changing the structure to comply with the Los Angeles code. No major changes were required on the work already completed

The change order was signed April 18, 1961. Construction had started shortly after the general contract was signed in August, 1960.



Labs Expand Medical Center

Two new laboratory buildings at the University of Southern California Medical Center in Los Angeles incorporate large and complex piping systems. The structures, 6-story Seeley Wintersmith Mudd Memorial Laboratory of Medical Sciences and 3-story Paul S. McKibben Hall, cost $3 million to build.

Mudd Laboratory alone has about five times the amount of piping as an ordinary 10-story building. Each student location is supplied with oxygen, hot and cold distilled water, gas, compressed air, vacuum disposal and drains. Supply lines are color-coded to avoid confusion. Horizontal runs of piping supply students above and below.

Framing is structural steel. End walls of Mudd Laboratory are cast-in-place concrete with a granite facing. Spandrels in one wall are tempered, enameled glass mounted in aluminum frames. In another wall, opaque charcoal spandrel glass alternates with glare-reducing windows.

Flewelling and Moddy of Los Angeles were the architects. Myers Brothers was the general contractor.

County to Build Seven Sewage Plants

Construction has begun on the second of seven sewage treatment plants called for in a long-range, $149-million sewerage plan adopted recently by Sacramento County, Calif.

The County Board of Supervisors awarded a contract for $2.75 million for the job. It covers construction of a 9-million-gal-a-day activated sludge plant, actually the first stage of the Northeast plant (see map). Two later stages of 9 and 17 mgd will bring total capacity to 35 mgd.

Construction had begun earlier on an 8-mgd primary plant, incorporated into the over-all plan as the first stage of the Central plant. Five later stages will add high-rate trickling filters and raise total capacity at the plant to 105 mgd.

The consultants divided Sacramento County into 13 major sewerage areas ranging from 4,400 to nearly 200,000 acres to facilitate the study. They planned systems for only seven, however. Existing systems can be enlarged to serve other areas where big population increases are expected, they said.

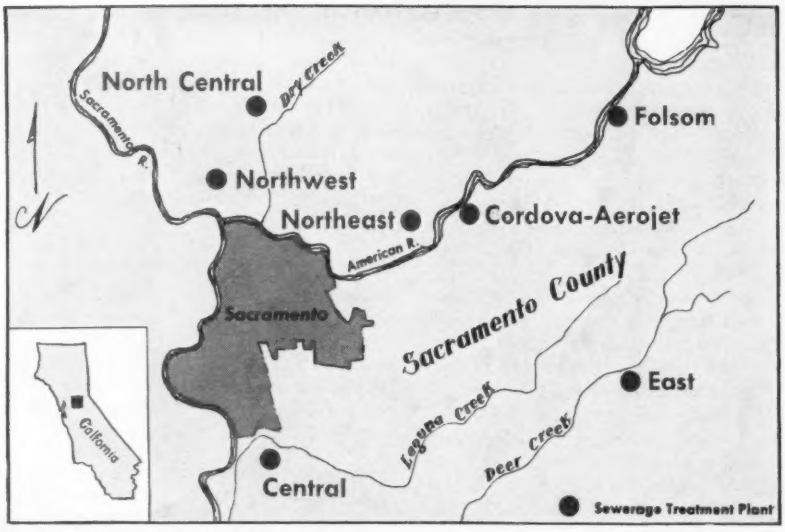
The study excludes the five incorporated cities in the county—Sacramento, North Sacramento, Folsom, Galt and Isleton—and a state prison and three military installations—McClellan and Mather Air Force bases and a U. S. Signal Depot. Population in the rest of the county, about 130,000 now, is expected to multiply about 15 times in the next 40 years.

The seven systems planned will encompass 259,000 acres, including 60,000 acres of industrial property; will serve an estimated saturation population of just over 2 million; will have an ultimate treatment capacity of 247.3 mgd, at four activated sludge plants and three high-rate trickling filter plants; will require 462 miles of trunk sewers, 20 miles of force mains, 14 sulfide control stations, and 61 pumping stations with a combined capacity of 95,000 gpm; and will cost from $610 to $825 an acre for a total project cost of $149.1 million.

Costs are based on an ENR Construction Cost Index of 875. (It stands at 854.48 this month.)

The table gives a breakdown of ultimate capacity and system cost.

Plant	Type	Capacity (mgd)	Cost (millions)
Northwest	Act'd sludge	45	$27.6
North Central	Act'd sludge	17.5	11.9
Central	High-rate tr. filter	105	59.3
Northeast	Act'd sludge	35	21.9



UNINCORPORATED AREAS of county will get sewerage under long-range plan.

Plant	Type	Capacity (mgd)	Cost (millions)
Folsom	High-rate tr. filter	13	$8.8
Cordova-Aerojet	High-rate tr. filter	3.8	2.8
East	Act'd sludge	28	16.9
Totals		247.3	$149.?

The engineers planned from two to six stages of construction for each plant. They also recommend stage construction of major sewer lines where the ultimate flow volume will require pipe capacity equal to or greater than that of a single 42-in. line. The first-stage line would be 24- or 30-in. pipe.

Most construction will be financed out of general obligation bond proceeds and special assessments. Ultimate sources of revenue will be taxes, individual connection charges, area participation fees and service charges.

All seven plants will eventually include secondary treatment. The consultants recommended activated sludge type where waste will be mainly domestic and constant in quality; high-rate trickling filters where it varies widely or contains considerable amount of industrial waste.

Early stages of development might include primary plants alone, but the engineers recommend confining these to locations that can discharge into the Sacramento River, the only stream in the region capable of diluting primary effluent sufficiently.

Primary treatment will include comminution, sedimentation, separate sludge digestion, sludge dewatering and effluent chlorination. It is expected to remove about 35% of the five-day BOD (biochemical oxygen demand) and 60% of the suspended solids.

Activated sludge treatment is expected to increase the removals to 90-95% of both five-day BOD and suspended solids.

High-rate trickling filtration, with one or two stages of filtration plus final sedimentation and chlorination, is expected to provide a moderate degree of BOD and solids removal—maximum of 90%—which can be varied by control of loading and recirculation rates.

The consultants noted that stabilization ponds might be used for temporary treatment in areas where they could be isolated. Preceded only by screening or comminution, or by primary treatment processes, stabilization ponds would be expected to remove 85% to 90% of BOD and solids.

The engineers recommend that industries with large or strong volumes of process wastes be discouraged from locating in all areas except the one served by the Central plant.

They also recommend administering the program under the existing system with certain changes. At present, sanitation districts in the county operate under coordination of the County Public Works Department. However, a Sacramento County metropolitan sanitary district ought to be considered as a long-range possibility, the consultants said.

The plan was prepared over a period of three years by Randolph H. Dewante and Edwin R. Stowell, Sacramento consultants. It was reviewed by Jack E. McKee, of California Institute of Technology.

Around the Country . . .

• **ECPD meets**—Engineers' Council for Professional Development heard, last week, the proposal to teach civil engineering as a five-year, graduate-degree course—but took no official action on it. Also at its annual meeting in Louisville, ECPD elected as president, Ralph Morgan, who is the new president of Stevens Institute. Scott Hill of the General Electric Co. became vice president.

• **To the victor**—A $32,000 fee awaits the victor in an open competition among California architects for design of a $475,000 governor's mansion in Sacramento. A five-man committee—comprising three architects, a philosophy professor, and an art gallery director—will judge the designs. In mid-December, the judges will announce 10 finalists; in February they will announce the winner. Apply to the Capitol Building and Planning Commission.

• **More ABC road funds**—The National Limestone Institute, an organization of highway aggregate producers, wants Congress to authorize the annual increases of $25 million for ABC highways, as set down in the 1956 Act. President Kennedy recommends $25-million increases every other year starting in 1964, until the $1-billion level is reached. At present, ABC funds are frozen at $925 million.

• **Parking problems solved?**—San Francisco will build the world's largest parking garage. It will accommodate 8,000 cars at the International Airport. Engineers are determining whether the building should be entirely above ground or partly underground. Edward B. Page is the architect and Gould and Degenkolb the engineer for the San Francisco Public Utilities Commission. Both are San Francisco firms.

• **Airport aid deadline**—Final applications for federal aid for airport development under the Federal Aid Airports Program are due October 31. The program will allocate up to $75 million during the fiscal year ending June 30, 1962. Federal grants will usually match local funds.

• **Lab complex completed**—Bethlehem Steel dedicated its $25-million Homer Research Laboratories (ENR Jan. 19, p. 40) on a mountain top outside Bethlehem, Pa., this week. Research there will feature work on low-cost, high-strength and corrosion-resistant steels.

• **Florida's five-year plan**—The Florida Road Department is planning to build 502 miles of Interstate highway through 1966, at a cost of $300 million. The state has 217 miles out of 1,126 of Interstate highway completed or under construction.

Airport Job Boasts 'Ideal' Aid Station

On-the-job medical service geared to the needs of an isolated construction site has proved its worth at Dulles International Airport, 27 miles west of Washington, D. C.

An on-site trailer clinic operated by a medical center 5 miles away gives immediate first aid to injured workers. For the more serious cases, the job clinic promptly summons additional medical-surgical help from the center, in Herndon, Va.

Two-way radio speeds such calls to the Herndon Medical Center, which maintains a doctor on duty at all hours of the day and night. The medical center provides a minor operating room, oxygen and X-ray equipment, patient rooms, and most of the other essential facilities found in a modern emergency hospital. Also, the center has extended its two-way radio system to include the automobiles of key members of its 17-doctor staff (two general practitioners and 15 specialists). Each of the center's doctors soon will have a two-way radio in his car.

On-the-job clinics are nothing new to Corbetta Construction Co., the contractor that initiated the Dulles Airport arrangement a year and a half ago. The Corbetta firm has for years installed a first-aid clinic on any job where the facility would speed treatment of injuries. In general, this meant every project situated more than a few blocks from the nearest hospital. Only exceptional jobs, such as highway contracts stretching many miles across country, could be exempted from the requirement that a central first-aid station be placed on the project near the firm's field office.

Even to Corbetta the Dulles setup rates a special mention. Superintendent Sam Pascoff calls the arrangement ideal and gives it a good share of the credit for the contractor's low lost-time record in performing upwards of $6 million of work on the structural portion of the airport terminal building. The on-site trailer clinic, staffed by a registered nurse throughout working hours, encourages workmen to have minor wounds dressed promptly instead of waiting until infection develops. Quick calls from the clinic or contractor's office, which also is tied into the radio net, have produced prompt medical center aid for the few serious accidents that have occurred.

Mr. Pascoff received eager collaboration from the medical center when Corbetta moved onto the site in the spring of 1960. The young doctors in charge were looking for ways to use the center's relatively new facilities. They offered to put a trailer clinic on the job and to back it up with the center's full-time service. The Michigan Mutual Insurance Co., which wrote the workmen's compensation coverage for the Corbetta job, approved the plan on recommendation of its Washington claims agent, Eastern Adjustment Co.

A big time saving was involved. The nearest hospitals were some 20 miles away, requiring a 45-minute trip in each direction, as against 20 minutes at the most to the Herndon center.

Other contractors and their insurance companies have been quick to see the advantages of the system that Corbetta introduced. Dr. John H. Renner, administrator of the Herndon Medical Center, says that the center now bills a dozen insurance companies serving as many contractors and subcontractors at the Dulles Airport.

Insurance companies are so pleased with the system that they have asked the medical center to place a second trailer clinic on another project, the Virginia portion of the $28-million Potomac interceptor service. The setup centralizes compensation cases for the insurers and keeps them up to date on job costs plus prospective liability for any serious cases not yet completed.

A medical service to construction projects will work only if the doctors like it, Dr. Renner says. Income from the service to Dulles Airport contractors has helped the medical center to pay off the debt on existing facilities. Further, the solid prospects of continuing revenue has made it possible to launch an expansion just announced.

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CONCRETE ROLLWAYS carry church 232 ft north and 265 ft west of original site.

1,550-Ton Church Makes Way for

It isn't the distance involved that makes a church-moving job on Chicago's near south side notable. It's the size and weight of the massive structure; the preliminary work needed to get it rolling; and the care and caution required to keep operations running smoothly.

The building covers an area of 132x117 ft and rises to a height of 55 ft. It weighs 1,550 tons.

Located at 37th and LaSalle Streets, the Progressive Baptist Church will move in two directions—232 ft north and 265 ft west across Wentworth Ave. to a new foundation.

The steel-frame building with brick and stone exterior and concrete block interior walls, is being moved to make way for the South Route of Chicago's expressway system.

The huge building, estimated to cost $500,000 and designed to seat 4,000 persons was already under construction when the expressway route was located through that area about four or five years ago.

Final decision was to complete the exterior masonry work and add the roof so that the building would be weather resistant until it could be moved to a new location. In the interim it has provided a haven for pigeons.

Moving operations got under way last spring by Belding Engineering Co., of West Chicago, Ill., under a sub-contract with Rousseau & Douglas, general contractor on the church-moving project.

• **Jacking operations**—The toughest part of the job, says Meric Belding, president of the 78-year-old house-moving firm, was jacking the 1,550-ton church up off its foundation.

Workmen used thirty-four 50-ton and twenty 15-ton hydraulic jacks to lift the structure, providing a factor of safety of 450 tons in the total capacity of the jacks.

Hartley Belding, superintendent in charge of moving operations, controlled all 54 jacks hydraulically from a single-valve console. All the jacks lifted at exactly the same rate regardless of the load differentials, until the building was about 3 ft above its reinforced-concrete foundation.

• **Heavy underpinning** – Transmitting the weight of the building to the rollers required a carefully developed system of underpinning. Short lengths of transverse railroad rails, spaced about 2.5 ft apart, transfer the weight of the building to six longitudinal lines of double 12-in. steel beams under the interior of the building. The two longitudinal exterior walls are each carried on two pairs of 12-in. beams.

The 12-in. beams transfer their loads to six transverse lines of 14-in. steel beams weighing 127 lb per lin ft. The 14-in. beams are braced longitudinally with 12x12-in. timbers wedged between their webs.

The 14-in. beams sit on roller shoes that bear on 3-in. dia steel rollers that move the building along on railroad rails. The 4-ft-long roller shoes are simply 3x12-in. timber plank laid flat between the vertical flanges of a 15-in. channel.

The rails are carried on 8x8-in. timber ties laid loose on timber cribbing over the area formerly occupied by the building, and on concrete rollways for the remainder of the moving.

While workmen jacked the building and installed underpinning, others constructed the concrete rollways on which to move it.

Eight lines of 4 ft x 8-in. thick concrete rollways carry the building 232 ft north. At that point Mr. Belding jacked it up, and rotated the rollers and ties 90 deg, to move the building 265 ft west on seven lines of double 4 ft x 8-in.-thick concrete rollways.

Workmen started moving the building north on September 1. By September 18 it had completed its northward journey and had started to move west. By Oct. 30 it will reach its new location on the west side of Wentworth Ave.

Four hydraulic jacks push the building along in 35-inch increments, that take about five minutes. The 15-ton jacks push against the roller shoes of the front transverse line of 14-in. beams. The rear of each jack engages the head

STEEL BEAMS transmit weight of building to steel rollers on railroad rails and ties.

a Highway

of one of the supporting railroad rails. As the jacks push the building forward, the back pressure locks them to the rails.

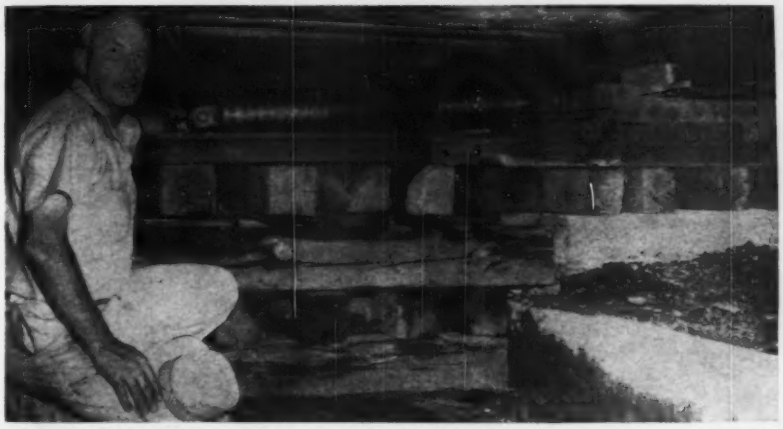
After each 35-in. move, the pressure is released and two workmen retract each jack forward, ready for the next push.

All four jacks operate in synchronism as far as speed of travel is concerned, but under different pressures due to different loads carried on the rollways. For example, the two outside jacks, where the heavier weight is located, operate at about 4,000 psi. The two interior jacks operate at a pressure of about 3,200 psi.

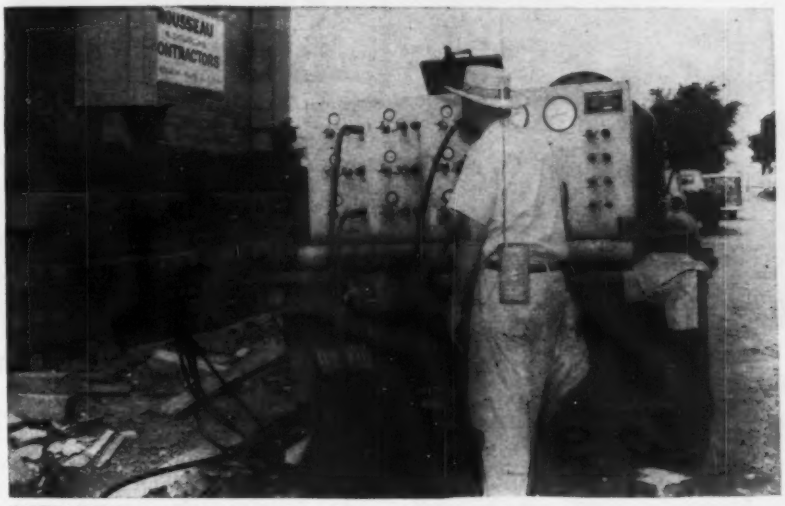
Each jack has its own hydraulic line and pressure gage, supplied from a common pressure tank. All four gages are mounted on a panel of the pressure truck for easy operation and control by the operator.

Should any one roller in a nest of 8 rollers get in a bind, the console operator knows it immediately, since the gage pressure for the jack in that area builds up sharply. He alerts the jacksetters of the trouble, by walkie-talkie radio strapped to his belt. Belding was able to control the whole operation by radio.

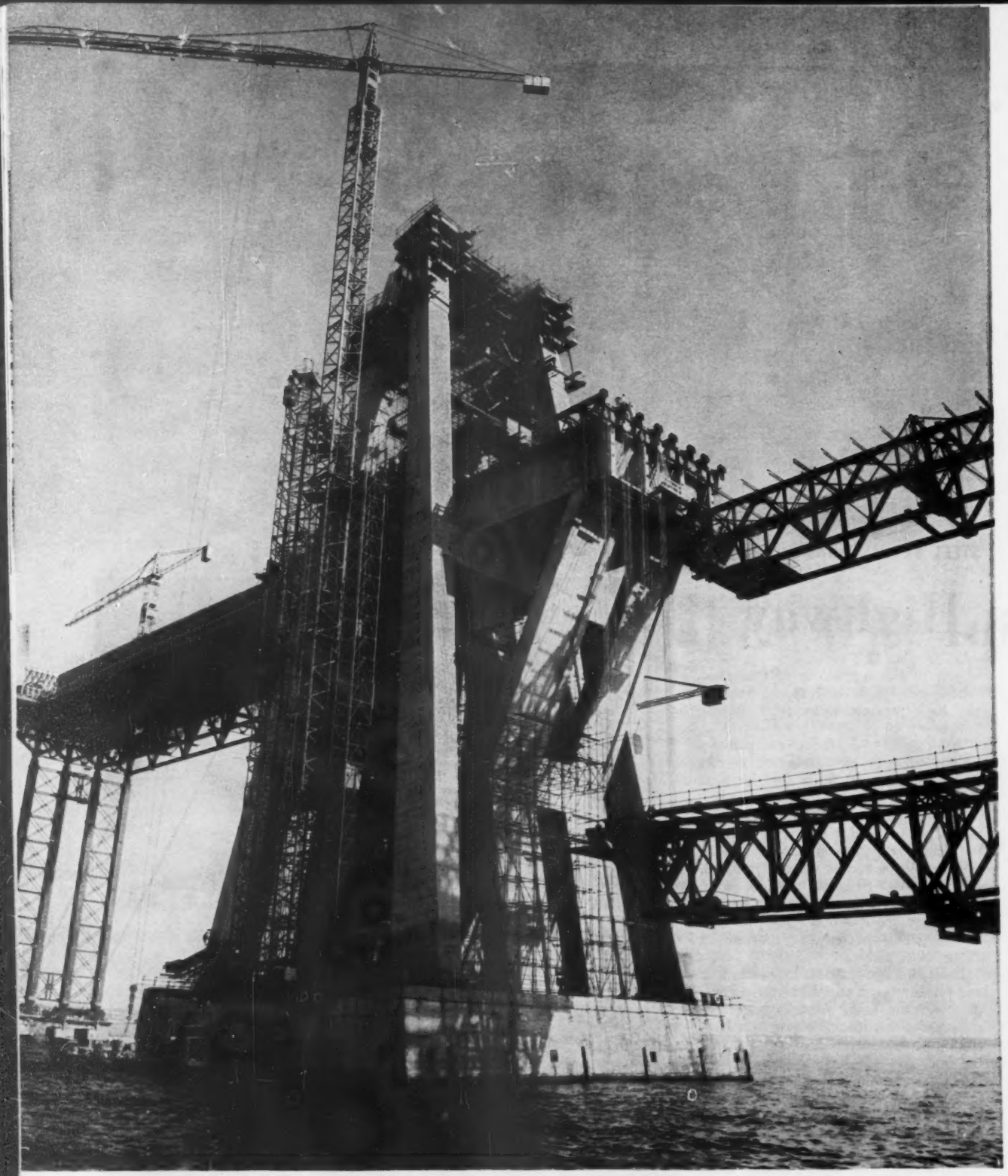
A 17-man crew performs the actual moving operations. As the building inches forward, workmen keep moving the last roller in each roller nest to the front position. Best day's moving was 60 ft. in eight hours.



HYDRAULIC JACKS ease church ahead in 35-in. increments.



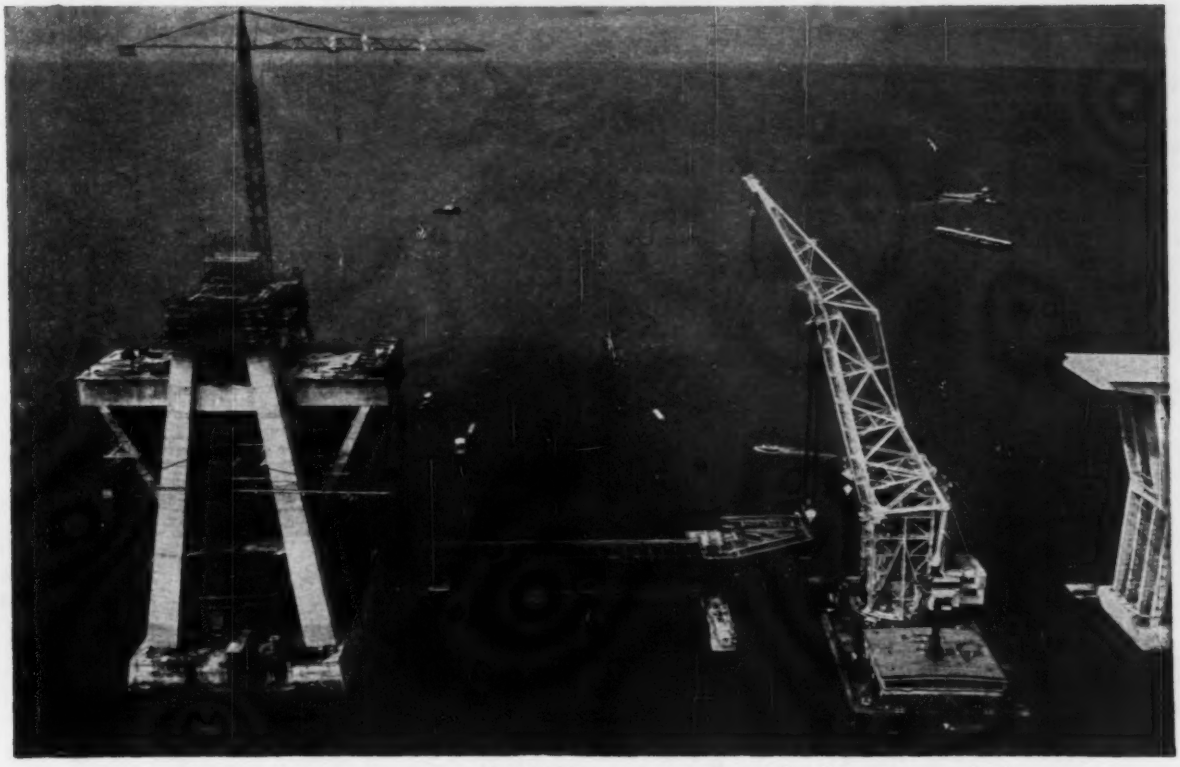
OPERATOR equipped with walkie-talkie synchronizes jacks.



Complex towers like this one rise 300 ft above the water to carry five 771-ft suspended spans.

Prestressed Concrete Spans Lake

Low-level spans comprising prestressed girders on pedestal piers form most of crossing.



Giant floating crane aids construction of 525-ft transition span flanking suspended spans.

Maracaibo

When completed next year, the 5½ mile long bridge spanning the outlet end of Venezuela's Lake Maracaibo will be one of the world's outstanding prestressed concrete structures.

It includes five 771-ft spans soaring 148 ft above the lake's navigation channels, which swarm with ships serving one of the world's greatest petroleum centers.

Designed by Professor Riccardo Morandi of Rome, the "great crossing"

Prestressed platforms on trestles support drop-in girders.

will include these notable features:

• Prefabrication and installation of hundreds of 153–ft-long, 220-ton prestressed concrete girders. They are used, with slight modifications at the ends, in 79 low level repetitive spans and as drop-in girders in twenty-eight 279-ft trestle spans, two 525-ft transition spans and the five high-level suspension spans.

• Casting and prestressing in place of 128-ft concrete beams on X-shaped trestles. Cantilevered both ways from the piers, these units support drop-in girders of the 279-ft spans.

• Construction of 620-ft-long continuous prestressed girders of the suspended spans in place on preassembled steel trusses weighing 250 tons each.

• Placing of hollow, cylindrical prestressed concrete piles nearly 4½ ft in dia and up to 197 ft long (made up of 19.7-ft sections) through metal sleeves that are later withdrawn.

• Use of unusual methods and specially built rigs to handle and place piles, girders and temporary trusses.

Consorcio Puente Maracaibo—a combine made up of Precomprimido C. A. of Caracas and Julius Berger A. G. of Wiesbaden, Germany—is building the bridge under a $79.5-million contract. Completion is scheduled for April, 1962.

The bridge will provide the first surface link between the city of Maracaibo, on the western shore of the lake, and the rest of Venezuela.

Total length of the structure is 27,132 ft, plus 1,335 ft of earth causeway at the eastern end. Maximum grade will be about 2.5%

Bents comprising four piers and a precast reinforced cap support the low level spans. From the eastern end, the low-level structure is 17-ft above the water for a distance of some 3,600 ft. It rises to 84 ft near the middle of the lake, where the trestle spans begin. At the western end, the structure begins at an on-shore abutment 49 ft above the water.

Over much of its length the bridge deck is formed by the top flanges of the prestressed girders plus cast-in-place concrete between them. The deck is prestressed transversely. It will have an asphalt wearing surface.

The 57-ft-wide bridge deck will carry four lanes of traffic with a 4-ft center median and two 3-ft sidewalks. Water and electrical conduits will pass through holes in the deck girders.

Lake Maracaibo's depth along the bridge route ranges from about 6 ft to nearly 60 ft at the channel.

• **Casting yard**—The contractor produces precast and prestressed components in a yard near the Maracaibo end of the bridge.

Components produced at the yard include precast, reinforced concrete piles; prestressed hollow cylindrical piles; 153-ft long prestressed T-girders; 120-ft prestressed T-girders (used in 19 short spans at the eastern end); and various forms and assemblies of reinforcing and prestressing steel.

The contractor casts reinforced concrete piles up to 115 ft long in one piece. Circular piles are 3 ft in dia; square piles are about 20 in. on a side.

Precast and prestressed hollow cylindrical piles are used in foundations for the suspension and trestle spans, and for ten piers near the eastern end.

The hollow piles are 4.4 ft OD, with walls 7 in. thick. They are cast vertically in split steel forms in 19.7-ft sections that are then steam cured. As many as ten sections are joined together and stressed by cables passing through ducts cast in the cylinder walls. The piles are post tensioned and the cables grouted in place. The contractor transports the piles to the job site on barges.

The 153-ft T-girders are identical throughout the bridge, except for modification of the shapes of the tips. Girders with square tips are laid end-to-end, four abreast in the low-level spans. Girders for closure of the trestle and suspension spans have indented tips that rest on the ends of the adjacent cast-in-place sections.

The bridge contains about 450 of these girders. The center rib is about 8¼ ft deep at mid-point, tapering to a little under 6 ft at the ends; the web is 7.5 in. thick. Top flange is nearly 13 ft wide, varies in thickness from about 10½ in. along the center axis to about 6¾ in. at the edges. There is a transverse beam at each end, plus three intermediate diaphragms. The 120-ft beams have the same slab thickness, but are shallower.

The contractor casts the girders in two steel forms—each in four sections—mounted on rails on either side of a concrete anchorage at each end of the bed. A rail-mounted crane places a wooden frame that carries reinforcing steel and tube assemblies for the web on the preshaped concrete bed. Transverse steel is placed for the end cross beams and diaphragms. Workmen then roll the forms into position on either side of the anchorage. They place the steel for the top flange, cast the concrete and later stress the girder.

The contractor also assembles wooden forms for the 128-ft cast-in-place trestle sections in the casting yard, and places reinforcing steel, ducts and prestressing cables. Crews assemble the forms in two longitudinal halves, each mounted atop a steel truss that supports the forms during movement to the job site and subsequent casting of the deck in place on the trestle. The entire assembly weighs about 210 tons.

• **Handling girders**—To install the girders in the low-level spans, the contractor brought double barges to a wharf at the casting yard. Crews ballasted the barges with water to sink them onto piles. They then used the rail-crane to load girders on the deck or on to adjustable towers on the barges. After loading, water was pumped out to again float the barges.

The next step was to tow a barge into position between adjacent piers. Water was again pumped in to sink the barge, leaving the girders resting on the piers.

One end of each girder is pinned, the other rests on a roller. For these spans, the only cast-in-place operation was for the central portion of the slab, after crews had placed the transverse prestressing cables.

Cranes hoist girders and form assemblies into place on the higher spans. The rigs include the "Ajax," a 300-ton capacity barge-mounted crane originally built for use on the Panama Canal nearly 50 years ago, and the "Elefante," a 250-ton island crane mounted on a platform with three retractable legs and carrying a 210-ft boom.

• **Cylindrical pile foundations**—A tremendous barge-mounted crane—the "Jirafa"—handles and places the hollow cylindrical piles (see picture, at right). Built especially for this project by R. G. LeTourneau, Inc., Longview, Tex., the unit has a 274-ft boom and can handle 137 tons at 85-ft radius. It rides on a 160x85x13-ft barge fitted with two electrically powered, 150-ton counterweights inside the hull. The crane boom head carries twin "swinging" sheaves for two main hoist blocks to permit handling the long piles.

Depth of pile foundations varies widely. Designers require the piles to be driven at least 6 ft below "firm ground." This means that piles extend from 30 ft or so to as much as 150 ft below the water level.

Prestressed piles are placed inside cylindrical steel sleeves sunk to the required depth. Each steel tube is 4½ ft ID. Initially, the tubes sink of their own weight, with sections added as necessary.

Each steel sleeve is fitted at the bottom with a serrated cutting edge. A collar at the top grips the sleeve so that it can be rotated back and forth to cut through the soil. A cutting head on the end of a hollow shaft works inside the casing. Water is pumped into the casing, and a mixture of soil and water forced out.

After the casing reaches the required depth, the Giraffe picks a prestressed pile from a barge, swings it to an upright position and lowers it inside the casing. With the pile in place, the casing is withdrawn slowly as grout is forced through holes in the lower end of the pile into the annular space between the soil and the concrete.

Two days later, builders force grout into the soil surrounding the bottom of the pile through a previously placed tube. Finally, the pile is partially or wholly filled with concrete.

• **Pile caps**—The contractor simplifies and speeds over-water construction of the foundations by use of precast elements fitted on top of the piles.

A single precast block caps each group of piles that supports a low-level trestle pier. The rigid block is tied to the piles just above the water level.

Each of these piers has four vertical columns of reinforced concrete with walls 2 ft thick; width of the columns varies from 11 ft 7 in. to 5 ft 3 in. A bent girder ties the columns together at the top and supports the prestressed girders of the deck.

Pile caps for the trestles of the 279-ft spans comprise two reinforced concrete blocks with sloping sides. Each is about 54x16 ft in plan and 12 ft high. The blocks are spaced about 25 ft c-c and each is supported by a group of 11 piles. Four reinforced concrete beams tie the blocks together.

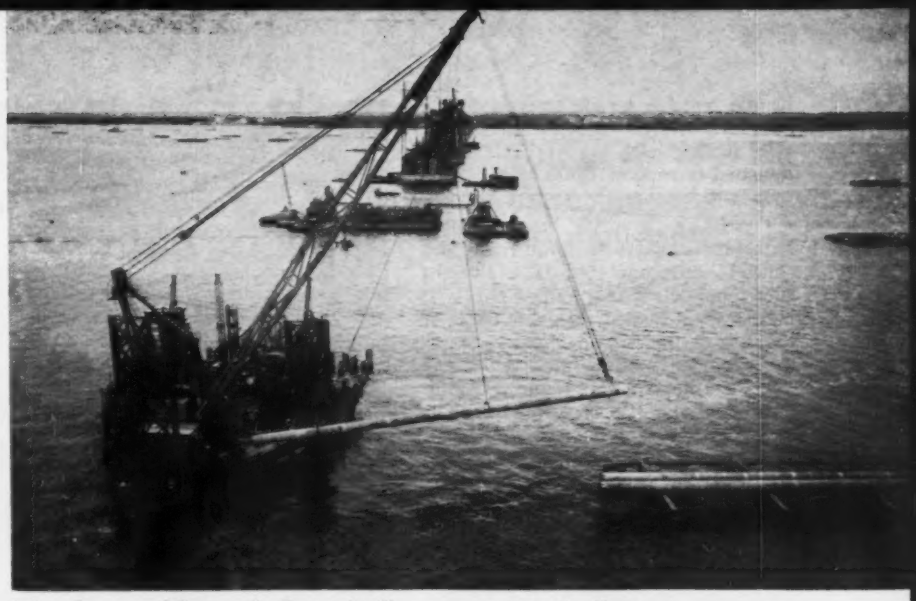
Crews first cut the tops of the piles to predetermined elevations. They then fit the precast shells over the tops of the piles, with the open ends down; the piles pass through holes in the top of the blocks. Next step is to install the cross beams, which are precast.

Workmen install the reinforcing steel that links the piles to the cap, then fill the piles with concrete. They place steel forms on top of the blocks and cast concrete within the forms. Additional reinforcing is installed for the complete platform and the bottom legs of the trestle and additional concrete cast in place.

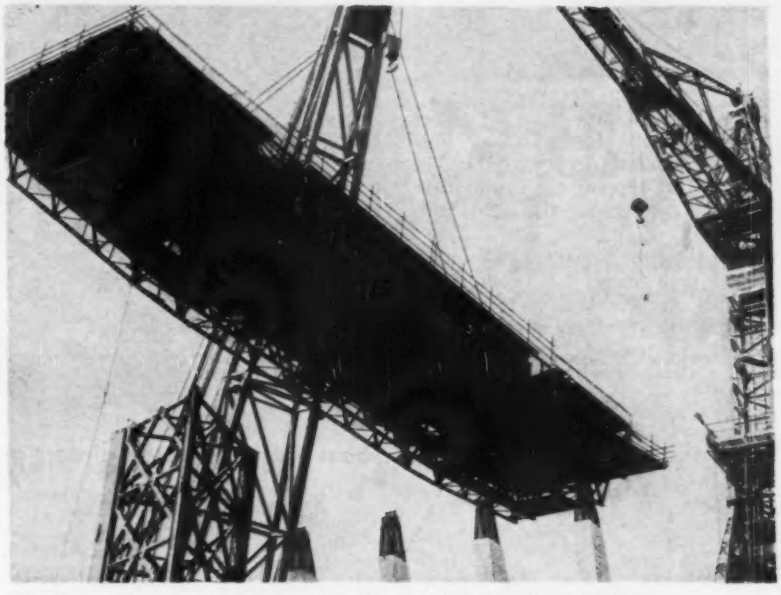
A fleet of barge-mounted batching plants supplies the concrete.

Platform for the foundation of each suspension tower is a large concrete block made up of 15 precast sections. The cap is 131x115 ft in plan and contains 7,800 cu yd of concrete.

It is reinforced concrete, with some prestressing cables of minor importance



Island crane lifts and places hollow prestressed piles.



Steel trusses support wooden forms for trestle platforms.

handle possible tensile stresses due to secondary forces. Seventy prestressed piles support each tower. Each pile is designed to support 1,000 tons.

• **Trestles**—Each trestle has four giant X (or distorted H) frames of reinforced concrete interconnected at mid-height and top. The basic frame is 131 ft high, with a spread of about 65 ft at the top of the X and about 33 ft at the base.

Dimensions of the frame are constant throughout, except that the bottom part is cut off to give the design height at each location. When the height of the trestle is 65 ft or less, the X is cut down to a V.

The contractor uses sliding forms to build up the frames in 13-ft lifts, simultaneously in all four frames. A tower crane anchored to the foundation platform handles the forms, reinforcing steel and concrete.

Sliding forms are hinged for the casting of the middle of the X. The contractor casts concrete for the cross beams in place in steel forms.

Crews form a hole near the upper tip of each arm of each frame. Pins inserted in these holes serve to anchor the jacks that support the cast-in-place prestressed deck during the actual construction.

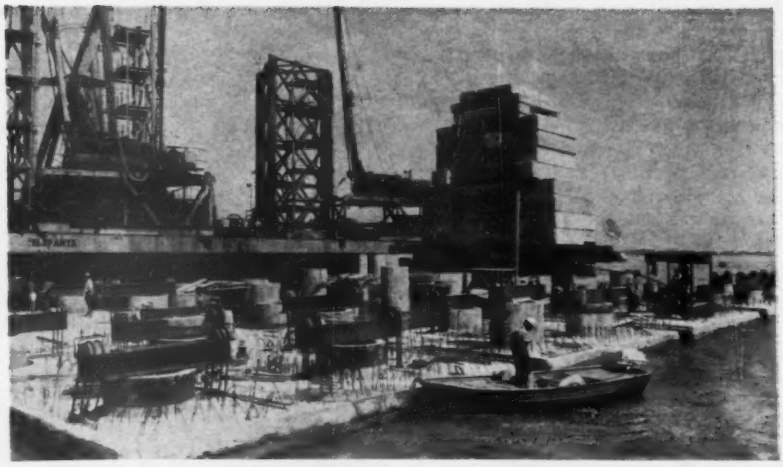
The contractor also joins the upper arms of each frame by a temporary horizontal steel tie with a turnbuckle to prevent the tips from spreading during deck construction. Similarly, temporary vertical tension members are attached to the deck form assemblies to prevent them from sagging during casting.

• **Trestle platforms**—The cast-in-place platform that rests on top of each trestle comprises two 128-ft-long prestressed box girders. Each girder is 9 ft deep between the supporting frames, tapering in the cantilevered portions on either side of the trestle. Webs are nearly 16 in. thick, spaced 15 ft c-c. The top flange is 28 ft 6 in. wide, varies in thickness from about 10¼ to 6¾ in.

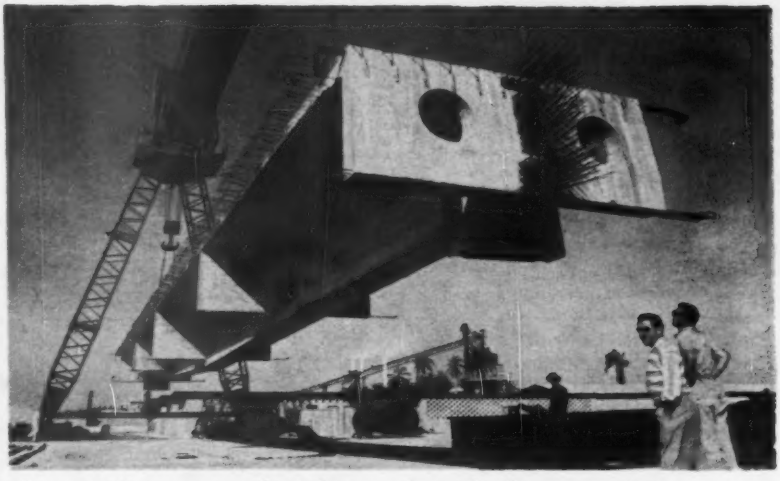
Cantilevered ends of the platform support 153-ft, drop-in, prestressed girders.

The contractor prefabricates wooden forms for the platform in two identical longitudinal halves. Twin steel trusses support each form. A crane lifts each assembly and places it on top of the trestle frame.

Each steel truss rests on the jacks anchored in the upper arms of the frame. Tips of the arms penetrate openings in the forms. Engineers consider the precision placement of the form assembly on the trestle to be the most delicate operation of the entire project.



Proof-tested piles will carry load of suspension tower.



About 450 prestressed girders go into the long crossing.

With the forms in place, workmen adjust the jacks to give the correct elevations, install and stress the temporary vertical braces.

The contractor concretes the platform in three stages. He first casts bottom slabs in symmetrical sequence, leaving the construction joints; then the webs; then the top slab. Final stage is to cast the construction joints.

Winches installed on the deck later are used to lower the forms about 3 ft to serve as working platforms for prestressing. The top slab is prestressed both longitudinally and transversely.

The contractor dismantles the forms in sections and transports them by barge to the next trestle.

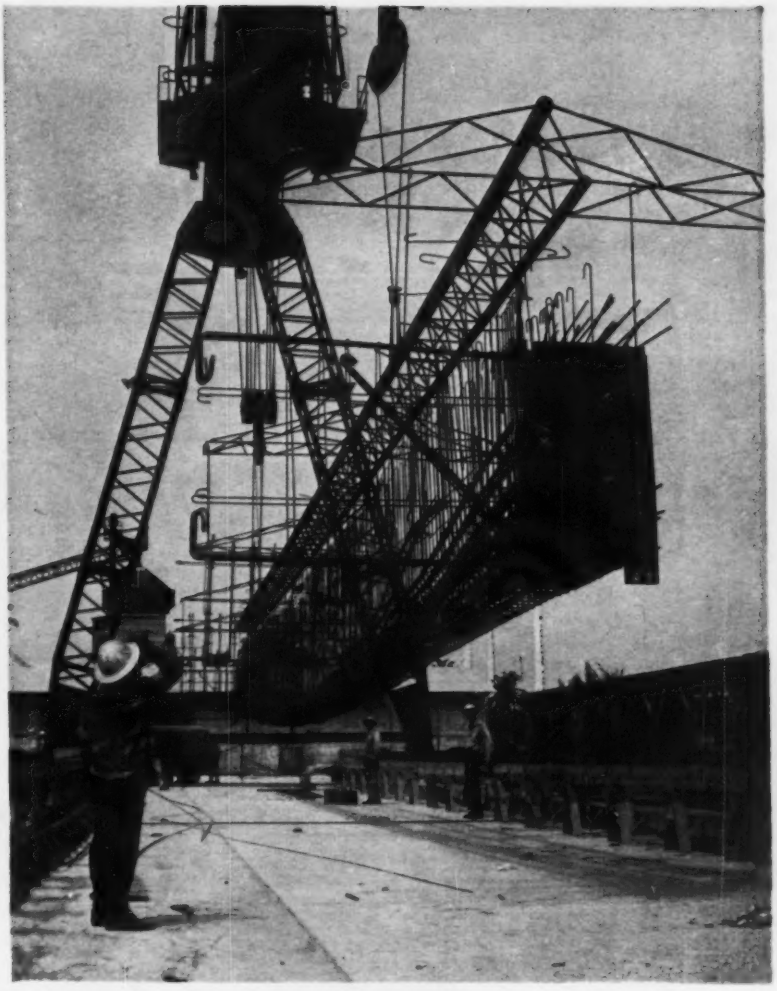
• **Suspension spans**—According to designer Morandi, "Each suspension span consists of a complex of six beams, each 620 ft 3 in. long. They were designed as continuous beams with six restraints of which four are governed by the oblique struts intersecting each other in the form of XX. The other two restraints are the two ends supported by the tension member that ties them and passes above the double antenna system in the form of an A."

The A antenna system and the XX frames are conventional reinforced concrete, built with sliding forms.

Total height of the towers is 303 ft; the deck is about 148 ft above the base. Points of support of the roadway by the XX frames are about 73 ft either side of the tower center line. Suspension cables are attached about 262 ft from the tower, leaving a cantilever of about 49 ft on each side.

Says Professor Morandi, "The continuous beam is prestressed internally by steel cables and externally by the horizontal component of the oblique antenna tension members. The latter are prestressed to compensate for the tension caused by the dead load deflection of the cantilever beams. This means that the only lowering of this support is that caused by moving live loads."

Maximum design stress in the cables is 6,586 tons; minimum stress is 6,027 tons.



Rail crane handles girder steel assembly in casting yard.

The continuous beam is a hollow box girder with four webs and high transverse rigidity. It is more than 16 ft deep between the points of cable suspension, tapering at the cantilevered ends. The webs are about 10 in. thick.

The contractor is building the continuous beam in three sections, in forms built in place. The middle section—160 ft long—is cast in a form supported by the tower cross beams and the XX frames.

For the two outer sections (each 230 ft long), the contractor uses forms supported by temporary steel trusses. Workmen assemble the trusses in the casting yard and move them to the tower site on barges. They mount hoists on the completed central section to lift one end of each truss from the barge. A large crane handles the other end. Two trusses are used for each outer section.

Workmen bolt the inner end of each truss to the underside of the central beam section. At the outer end of the truss, a hinged leg swings down to rest on a temporary foundation consisting of a cluster of steel piles with a steel cap. Jacks on top of the cap adjust the elevation of the truss.

The contractor then builds forms on top of the trusses, casts and stresses the concrete. Next step is to attach the suspension cables. Each cable comprises 16 strands, each about 3¼ in. in dia. Strands are arranged in an outside ring of interlocking Z-strands that enclose a core of circular strands.

Biggest problem for the contractor is transferring the load from the supports of the steel trusses to the cables, since the concrete beam can not function until it receives the horizontal components of the forces on the cables. Transfer of load will be accomplished in small increments by alternately lowering the jacks supporting the steel trusses slightly and tightening the cables, keeping the outer end of the beam always at the same elevation.

All prestressing is done by a system developed by Professor Morandi and used widely in Europe. The system makes use of cylindrical wedges to stress three cables at one time.

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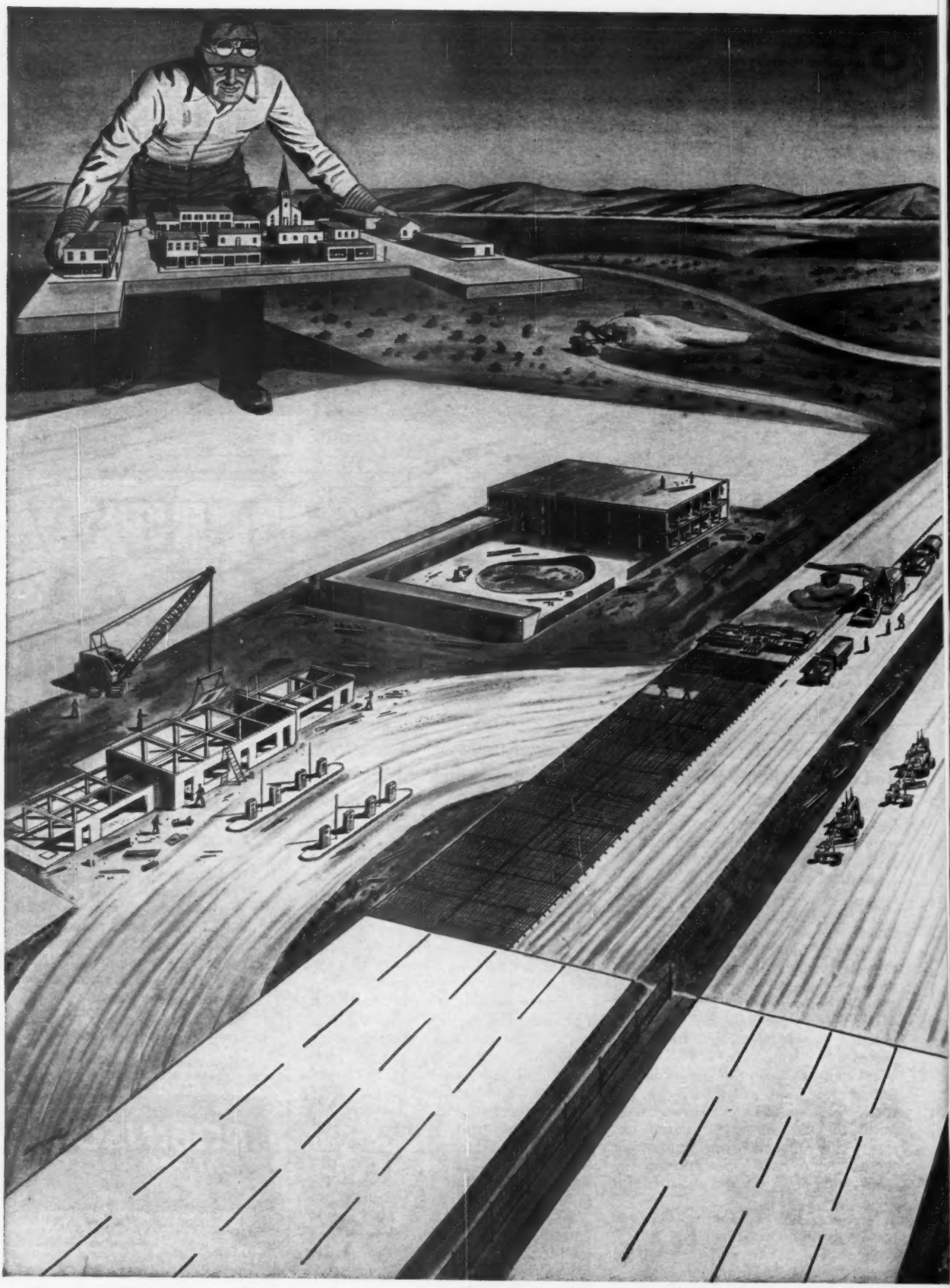

New Highways help fill up America's wide open spaces

New highways not only connect established cities, they also create new towns and villages along their routes. As service areas and motels spring up to serve the traveler, new settlements gradually grow up around them.

CF&I—a nationwide company—makes a wide range of steel products to help build the roads and service areas that, in turn, help build a better America. This illustration shows the many roles these products play in the creation of one such roadside community.

More and more contractors now realize that no company is better suited to serve this country's growing needs than an American company like CF&I. Top quality steel products and expert on-the-job technical assistance are two of the meanings inherent in CF&I's corporate image. For complete details on these and other steel products, consult your nearby CF&I sales office or write for Catalog G-104.

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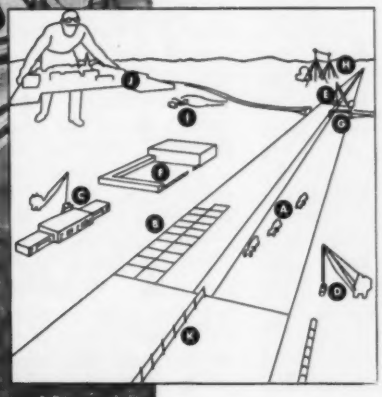
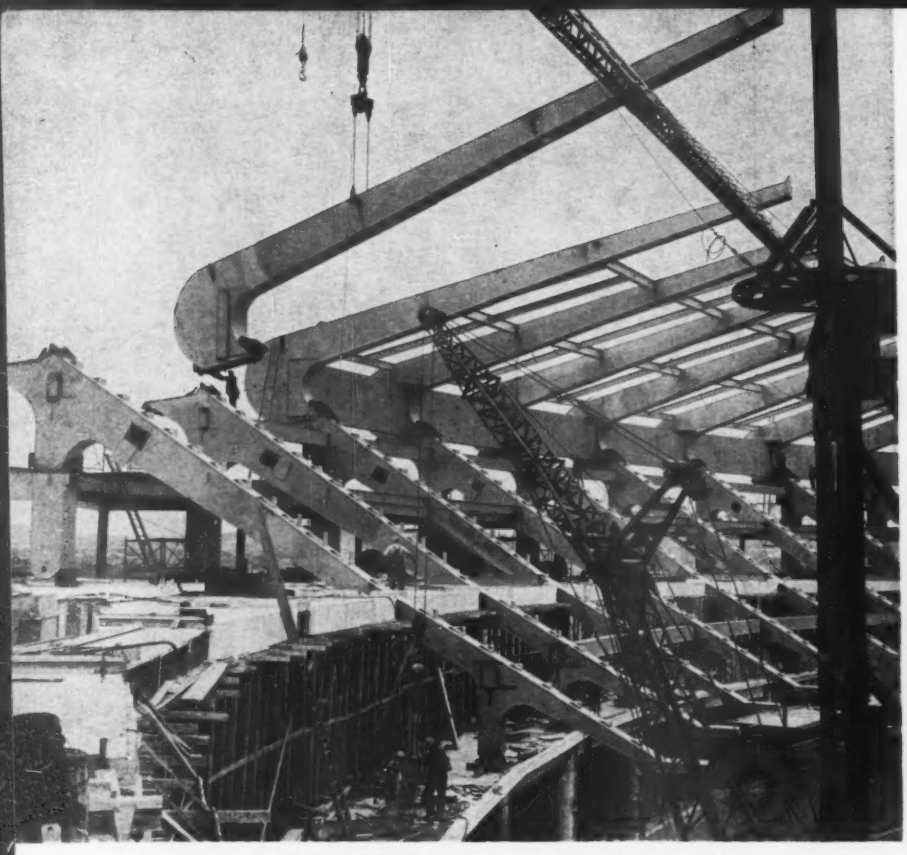
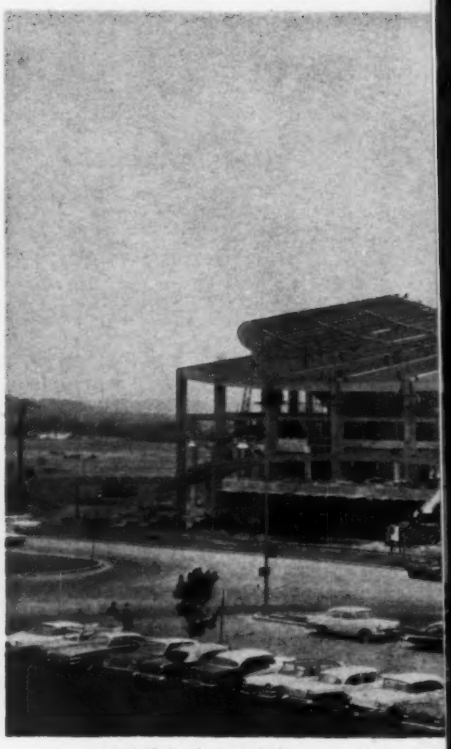


(A) CF&I Cutting Edges for road scraping and grading • CF&I Welded Wire Fabric for reinforcement of **(B)** concrete highways, **(C)** tilt-up sections and **(D)** concrete pipe • **(E)** CF&I-Wickwire Wire Rope and Slings for cranes • **(F)** CF&I-Realock Chain Link Fence for property protection • **(G)** CF&I Prestressed Strand and Wire for precast concrete bridge girders • **(H)** CF&I Galvanized Strand for guying radio towers • **(I)** CF&I Industrial Screens for sizing sand and aggregate • **(J)** CF&I Wire Products for farms and homes • **(K)** New type medium barrier consisting of Realock Chain Link Fence and Wickwire Rope Safety lines prevents out-of-control cars from hurdling divider into oncoming traffic, and also prevents them from bouncing back into their own lane.



Cantilever girders, 83 ft long, support stadium roof.



Welded steel frames form

Alligator-Jaw Steel Bents Frame

An unusual design for maximum spectator convenience required unusual construction techniques for a $22.5-million stadium in Washington, D.C.

The stadium opened for the football season this month and should be completely finished before next spring's baseball opener for the Washington Senators.

Located on a 100-acre site about two miles east of the Capitol, the new stadium provides unobstructed vision for 50,000 football fans and parking for 12,500 cars. A movable steel-framed grandstand of 6,500 seats adapts the oval stadium plan to either baseball or football. During football season, addition of temporary scaffold seats in the area vacated by the movable section adds 5,000 seats to the 45,000 baseball capacity.

The stadium comprises a five-story basic concourse structure framed in reinforced concrete and topped with 66 giant steel frames. These are shaped in elevation like open alligator jaws. Spaced peripherally about 30 ft c-c, each frame has two stub columns spaced 45 ft c-c. Upper cantilever girders, about 85 ft, carry the grandstand roof; lower girders, up to 80 ft long, carry the upper grandstand framing. A short cantilever extends beyond the lower, interior column in a typical frame.

Precast, prestressed concrete planks span between steel purlins to form the roof deck. L-shaped precast concrete tread-and-riser sections floor the upper grandstand.

The stadium has an undulating roof, with exposed steel frames painted light grey. Vertical aluminum fins, up to 50 ft high, are bolted to the concrete base structure about 6 ft c-c. Ramp spandrels and have an exposed-aggregate finish.

• **Erecting the frames**—Bethlehem Steel Co., the steel erector, teamed a rail-mounted tower derrick traveler with two long-boomed crawler cranes to erect the welded frames. The traveler rig comprised a stiffleg derrick of 35-ton capacity on a steel tower 85 ft high. The stiffleg boom, 90 ft long, was equipped with a 15-ft jib.

The traveler rode rails founded on a continuous timber mat. As the traveler moved around the stadium along a 60-ft track section, the erection crew leapfrogged the track and mats. To move the traveler, two cranes, one ahead of each track, lifted against a horizontal, two-block tackle attached to the crane and the traveler.

The most difficult part of erection was getting started. The first two frames had to go up simultaneously for lateral stability. Guying a single frame would have overloaded temporary field connections. After the first two frames were in place, however, the others went up individually.

To start frame erection, the traveler and the 80-ton crane erected a pair of exterior columns, and the grandstand crew drove home 4-in.-dia pins in the hinged bases. The crew guyed the column erected by the traveler, freeing it to erect a strut bracing the columns. A field crew on the ground temporarily spliced the upper-grandstand girders and the short interior columns. Then the traveler swung the spliced sections into position. After the lower girders were in place, the crane erected a strut between them, and the steel workers installed guy bracing.

Next came the most critical part of the job—erecting the first cantilever roof girders. While the traveler held one roof girder in position, the 50-ton crane hooked onto it and took up part of the load. The crew installed temporary splice pins and freed the traveler to erect the adjacent roof girder. While the 50-ton crane and the traveler held

an undulating roof as erection team proceeds around Washington, D. C., stadium.

a Stadium

the roof girders, the 80-ton crane erected a strut and roof purlins between them.

After the traveler moved to the next bay, the erection sequence then entered its basic procedure:

- Erect exterior column and guy it.
- Erect main grandstand girder with interior column previously field spliced to it on the ground.
- Connect struts to a previously erected frame.
- Erect cantilever arm of grandstand roof.
- 80-ton crane erects heavy strut and one roof purlin, while the traveler holds the roof girder.
- Traveler moves on to the next frame, while 80-ton crane finishes roof purlins.

Several bays were guyed to stabilize the frames as erection proceeded.

Delayed by bad weather in the late winter months of 1961, Bethlehem started rolling when good weather came. At their best pace, they averaged nearly one frame per working day.

• **Field-welding the splices**—Welders followed soon after temporary field connections had been made with high-strength bolts.

Bethlehem developed an ingenious

Derrick traveler teams with two crawlers to erect frames.

method of aligning the field splices of the big box sections. At the major splice plane in the typical frames, precisely located pins joined brackets on the inside flange plates. Small rectangular guide plates on the outside of each web aligned the web plates.

At the outside of the roof-girder haunch, threaded rods, pulling against stiffened brackets, permitted the field crews to rotate the girder for precise adjustment of the cantilever end elevation. These exterior haunch connections had to resist erection loads computed to be 186,000 lb in tension.

Pin-connected brackets align the sections at splices where no cantilever end adjustments are required. Plates, 1¼x⅞ in., shop welded to the inside surface of the box sections, backed up the single-V butt welds detailed for all frame splices.

Flange plates are 1¾ in. thick in regions of maximum stress; web plates are ⅝ in. thick.

After completing the welding for each frame, the welding crew burned off the splice brackets. Radiographing of tension welds insured structural integrity of each joint.

WELDER completes web splice at box-girder haunch. Tension rods (arrow), pulling against stiffened brackets, rotate the roof girder into correct alignment and end elevation.

• **Moving stands**—A novel feature is the 400-ft-long section of movable seats. Drawn by tractors, this section will travel on rails about 300 ft from its position along the third-base line to a position parallel to the football sidelines.

The outside rail runs atop a 9-ft-high concrete wall just inside the masonry wall of the concourse structure. About 68 ft away, the inside rail is buried in the field, shielded from the earth by a glass-fiber tray. Grounds-keepers will remove the sod at each change of sports season to uncover the rail.

Framing for the movable grandstand section comprises 17 steel trusses carrying steel plates bent into L shapes to form the treads and risers of the grandstand.

Under dead load only, the trusses cantilever a maximum of about 20 ft beyond the inside rail, while the section is being moved. Under live load, however, the trusses require support at their inside ends.

Jack piers, built atop a continuous pile cap supply this support. Hydraulic jacks mounted at the ends of the trusses swing down onto the piers to provide the truss reactions.

STEEL-FRAMED STANDS (arrow), seating 6,500, swing 300 ft around stadium to increase seating capacity during football season when stadium capacity reaches 50,000.

• **Building the base structure**—An assembly-line forming technique enabled the general contractor building the four-story reinforced concrete concourse structure supporting the steel framed roof and grandstand to stay ahead of the steel erector.

Cranes swung pre-assembled girder forms into place, followed with beam forms. Then carpenters installed extendable steel joists between the beam forms and nailed down plywood forms for one-way slabs.

The lower grandstand section, which extends from behind homeplate along the right-field foul line, is part precast and part cast-in-place concrete. The lower grandstand framing has shallow risers (6 to 8 in.) in its inside portion, from the field up to the interior first beam, parallel to the foul line. The contractor decided that framing this section with precast concrete would have been impractical.

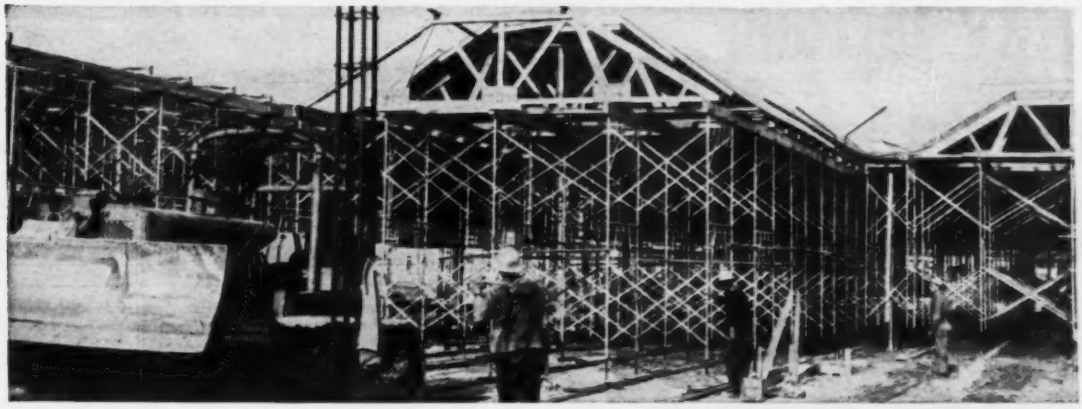
Stadium design was a three-firm venture: Osborne Co. of Cleveland was architect-engineer for the superstructure; George L. Dahl, architects & engineers, of Dallas, were consulting architects; and Ewin Engineering Associates of Washington designed the pile-supported foundations.

McCloskey & Co. of Philadelphia is the general contractor. Pittsburgh-Des Moines of Baltimore fabricated 28 of the 66 steel frames. Bethlehem Steel Co. fabricated the remaining 38 frames. Structural steel totaled 7,350 tons.

Scaffolding and Shoring Methods . . . by PSS

Sliding shoring speeds big roof . . .

McCrory Constr. Co., contractor, uses sliding shoring to speed forming a 260,000 sq. ft., 4-in. thick, folded plate slab roof for Richland Mall Shopping Center, Columbia, S.C. 1800 frames of "Trouble Saver" (R) Shoring are used. After stripping, 24-ft. wide by 100-ft. long sections, with wood trusses in place, are slid by tractor on sills to next pour area. Usual dismantling is eliminated, except under drop beams between bays.



Few parts make forming scaffold . . .

To get working platforms for setting forms for the inner 85-ft. high, 22-ft. diameter concrete wall of a new double helix ramp parking garage in Milwaukee, Siesel Constr. Co., contractor, uses only 264 of frames "Trouble Saver" Scaffolding. As 20-ft. high wall sections are completed, new 20-ft. lifts of scaffolding are erected.

Simple protection bridge . . .

During third floor addition to Baltimore Gas & Electric Co., the company used this easily erected protection bridge for pedestrian safety. Only 32 units of light duty Canopy Frames, 34 standard 6 ft. 6 in. high frames, 12 three-foot frames and four trusses of "Trouble Saver" Scaffolding are used. Note how trusses span truck entrance for traffic flow.

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Building Mexico's Malpaso Dam, LW Haulpaks® overcome

rocky terrain, tropical heat, heavy rains

The Malpaso Dam project is probably the most difficult test you could give a hauler to prove its dependability and production ability. The new dam, largest in Latin America, is located on the Grijalva River, in an isolated section of the tropical state of Chiapas, Mexico. And it is here, that LeTourneau-Westinghouse Haulpak trucks are performing with exceptionally high efficiency.

"In six months we have proved, without doubt, that Haulpak is a magnificent hauler," says Ing. Roberto Gayol, Resident Engineer for COCONAL, Mexico, D.F. *"It performs with extraordinary efficiency carrying big rock chunks on steep grades, and in heavy rains, which are the next thing to floods!"*

Two contracting firms, COCONAL, S.A., and OMSA, S.A., Mexico, D.F., are working a total of seven LeTourneau-Westinghouse 27-ton Haulpak trucks, helping move 15.7 million cu yards to construct this dam, biggest in Latin America. Here is a pictorial report of these 335-hp LW Haulpaks at work.

"Carries bigger load than other haulers," is the way Sr. Rafael Reyes Cortes, of the COCONAL firm, describes LW Haulpak. Deep V-body gives you extra load capacity within short wheelbase, carries up to 8 tons *below* normal floor-line. Haulpak's high-tensile strength steel bowl withstands loading shocks, resists dents.

Preliminary work to actual construction of the 377-ft wide, 426-ft high Malpaso Dam includes the digging of 5 diversion tunnels and building 2 permanent cofferdams. Here, one of OMSA's four Haulpak trucks dumps rock hauled from tunnel excavation. Ing. Miguel Marrón, General Superintendent for OMSA, says, "Haulpak is a marvelous performer, has a good reputation."

20 hours a day, 6 days a week is the work schedule for OMSA, S.A. A grueling assignment, yet Haulpaks perform steadily hauling up 8% grades and in tropical temperatures — average 162 tons per unit on 1300-ft cycles. Reasons for performance like this: *LW power-transfer differential* — automatically transfers power from slipping wheel to drive wheel on best footing. And exclusive Hydrair® suspension — cushions load and road shocks, keeps load riding level, gives longer tire life.

Haulpak positions faster at shovel and at dump area because it turns in ⅓ less space than comparable haulers. Makes 180° turn in area only 44 ft 6 in. wide. You get this short turn because LW Hydrair suspension eliminates springs and axle obstructions at front wheels. Upkeep costs are greatly reduced, too.

LW Haulpaks are available in 5 end-dump sizes, 22 to 65 tons. Ask for complete information.

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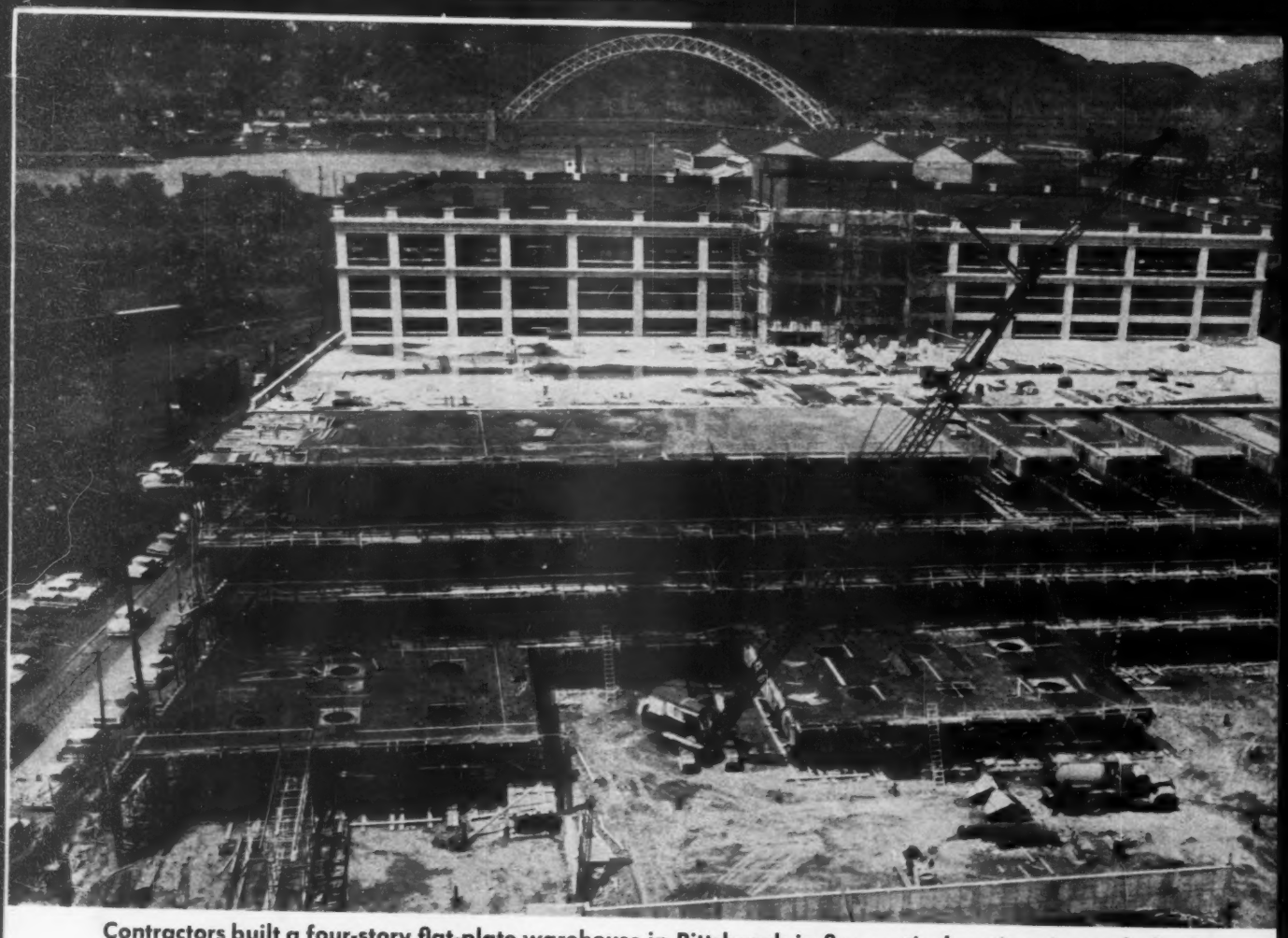

Contractors built a four-story flat-plate warehouse in Pittsburgh in five vertical sections instead of a floor

Stacked Forms Fold and Slide to

Dick Corp. cut nearly six weeks off the time needed with ordinary methods to build a 320,000-sq ft, four-story warehouse.

The project is a $1.8-million reinforced concrete addition to the North Side warehouse of Kaufman's Department Store in Pittsburgh. Where a builder would usually form and cast one complete floor at a time, Dick instead divided the 287 x 272-ft superstructure into five separate, 4-story sections and completed them one at a time.

Each section extended across the 287-ft width of the building. Workmen slid the forms for each story ahead as a unit, from section to section, as concreting progressed across the site.

One immediate result was a speedup in subcontract work. For example, Dick put up first a large freight elevator between the old and new parts of the warehouse. One group built its reinforced concrete frame to the roof as other workmen cast foundations for the addition. By the time the first warehouse section was completed, the elevator installation was under way. At the same time, electrical and mechanical trades started their work, masons laid up walls and concrete work continued in the next section.

Dick designed a system of movable forms for the four-story sections with separate sets of forms for each floor. Shores consisted of double lines of steel scaffolds in each bay. Timber rails atop the scaffolds carried the forms for the 8½-in.-thick, flat-plate slabs.

The scaffolds rode on sills—or skids—over the floor beneath. Dick at first feared that pulling the form units—each about 20 ft wide and 61 ft long—across the slabs would damage the new floor. But liquid soap under the skids lubricated them and prevented damage.

For sliding forms to be successful, Dick had to get around—literally—the interior columns, spaced about 20 ft c-c across the warehouse. These columns are circular and topped by conical capitals and square drop panels. To permit the form units to slide past the columns to their next position, carpenters hinged the forms along both sides of each column line so they could fold.

Folding portions of the forms included half a drop panel for each column. This panel had a circular opening to match the upper circumference of the column capital. Carpenters placed column and capital forms after securing the form units in position.

Adjustable shores held the hinged panels level during work on each section. After a slab cured, carpenters jacked down the scaffolds to strip the forms, folded them and moved the unit to its next position.

Masons and laborers cast one or two-thirds of a section's floor each working day once the work began to move. Strippers moved forms about 48 hours after a pour and left slabs reshored for 10 to 12 days. They could move and reset a form section in four hours.

"Once the unit was free, you could nearly push it by hand," a Dick engineer said. A high-boom crawler crane, however, provided most of the force needed, by pulling with a single-part line. Soap

at a time.

Speed Work

under the skids would dry out at times, but flushing with a hose just before moving restored its lubricating power.

The 8½-in.-thick floor slabs were designed for 3,000-psi strength at 28 days. But test cylinders broke close to the expected seven-day strength of 2,000 psi after only about two days, when the forms were moved.

The company claims this method of construction meant "an absolute saving in time, money and manpower" simply because form rebuilding between floors and between sections was unnecessary. A crew of 45 carpenters built the 61-ft deep form units but only 20 moved and reset them.

Dick calculates the forms cost 80 to 90 cents per sq ft in place for the five floors of the first section. But shifting them intact dropped this figure to an overall cost of about 42 cents per sq ft for the total area of all floors and the roof.

Abbott, Merkt & Co., New York City architects-engineers, designed the warehouse addition.

THE CLIENT IS PLEASED

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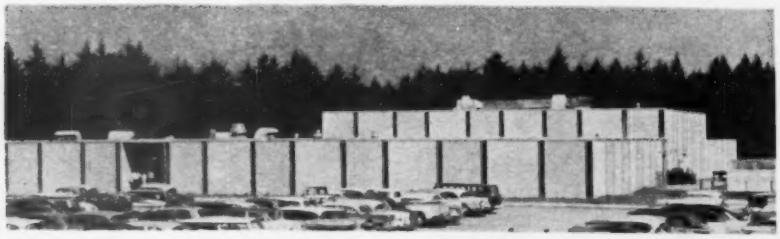

Sandwich Walls Have New Filling

Sandwich panel walls, for increased thermal insulation, are turning out in more varieties than the sandwiches listed on restaurant menus. The latest is made of concrete and plastic.

About 85 concrete and plastic panels are used to keep in the heat, keep out the cold and prevent vapor transmission through outside walls of United Control Corporation's new electronics plant in Bellevue, Wash. The panels are formed on the building site and tilted into position as the outside wall.

At the United Control plant, tilt-up panels are in two sizes, 9 x 12 ft and 22 x 12 ft. Each size is 5 in. thick, has concrete slabs 1¾ in. thick and foamed plastic cores 1½ in. thick.

The panel's plastic core offers a thermal insulating factor as low as 0.23. Made of Koppers Company's Dylite, an expandable polystyrene, the cores are boards manufactured by Kirkland Industries, Inc., Kirkland, Wash.

After United Control's plant floor had been installed, forms for the wall were placed on the floor. First concrete for the inside facing was cast over reinforcing steel. Then, the insulation board was placed while the concrete was still soft, to obtain firm adhesion. And finally, the outside face was cast.

To completely seal each panel, the insulating core was kept back 6 to 8 in. from the edges of the concrete face, thus allowing the concrete to come together on all sides of the panel.

Panels were grouted at the floor and bolted to clip angles at the roof.

Architects are Kirk, Wallace, McKinely and Associates, Cawdry and Vemo, Inc., is the general contractor.

Altitude Meter Takes to the Road

The U.S. Geological Survey has put to work two truck-mounted elevation meters that automatically measure and record elevation changes as they travel along the road. They establish control point elevations for producing topographic maps from aerial photographs.

The meters, mounted in specially adapted panel trucks, measure the speed and angle at which the truck is traveling. This information feeds automatically into a small computer that digests it and continuously derives elevation changes from a starting point. A sensitive electronic pendulum measures the angle while a small fifth wheel measures velocity. A touch of a button prints out the accumulated elevation change at any desired point.

The instrument-carrying truck has been especially modified to reduce error to a minimum. All four wheels steer so that the rear wheels track the front wheels on curves. All four tires are connected to a common pressure manifold so that false slope readings can't be brought on by one low tire. And the fuel tank has been put at the center so varying gasoline levels won't shift the vehicle's center of gravity.

Sperry-Sun Well Surveying Co., of Houston, developed and produces the equipment. They claim traverses up to 100 miles a day or transfer elevations up to 300 miles a day are possible—rain or shine, day or night. Accuracy is superior to barometric leveling and compares favorably to transit, alidade or "fly" spirit leveling on long traverses.

Unorthodox Use of Welder Causes Common Failure

International Harvester Co. reports that many heavy equipment owners are paying the price of unnecessary maintenance just to get a fast start.

While it may be ingenious to start stubborn motors with current developed by electric welders, the manufacturer points out that this is an example of using the wrong tool on the wrong job.

Because the voltage from the welder is much higher (as high as 110v) than on the equipment, something has to give.

Sooner than later, glow plugs often melt under welder current. Later, other components will have to be replaced, if electric welders are continually used as a starting aid.

(Advertisement)

Progress Report on STEEL CONSTRUCTION

OCTOBER 1961

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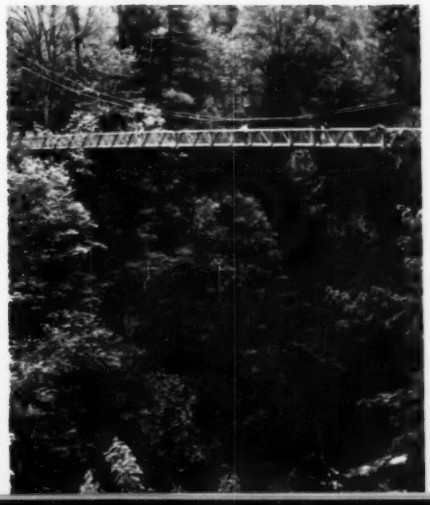
BETHLEHEM STEEL COMPANY

The smallest suspension bridge we've built



ITHACA, N.Y.—Sons of the Big Red will recognize this spot. It's the pedestrian crossing of Fall Creek gorge, at Cornell University, linking the area occupied by dormitories, fraternities, and sororities, on the north side, with the main campus on the south. It used to be spanned by an aged eyebar-chain suspension structure, with a 5½-ft-wide plank walkway. Now there's a new bridge—wider, stiffer, safer, and far more attractive.

Bethlehem bridgemen handled both dismantling of the old structure and fabrication and erection of the new one. The vital statistics: main span—270 ft; height of towers—41 ft; bridge deck—nine 30-ft panels topped with concrete-filled steel grid, 8 ft wide; stiffening trusses—4½ ft deep; main cables—2 in.-diameter strand hangers—⅞-in.-diameter wire rope at 30-ft centers.

The know-how that went into our smallest suspension bridge was acquired by Bethlehem Steel in nearly a century of bridge-building. During that time we've put up some real whoppers, including the famous Golden Gate and George Washington bridges.

Owner-designer: State of Oregon, Department of Highways;
general contractor: Bethlehem Steel Company, Pacific Coast Division

Pacific panorama

NEAR BROOKINGS, ORE.—The combination of ocean, sky, rugged Oregon coastline, and soaring steelwork made this project a photographer's dream, but also helped make it something of a bridge builder's nightmare. For one thing, the superstructure is 'way up, with the roadway a dizzying 350 ft above the canyon floor. And to compound the peril, winds often whistle through the ravine in two directions at the same time. Note the use of safety nets.

The project is a two-lane continuous deck-truss bridge carrying U.S. Route 101, the Coastal Highway, over the gorge formed by Thomas Creek, a few miles north of Brookings. The steelwork extends 848 ft between abutments, with the longest span—385 ft—being at the south end. The superstructure is supported by two steel-frame towers rising from heavy concrete piers. The center span measures 185 ft.

The erection procedure called for all construction to proceed from the south side, using a stiff-leg derrick traveler, and cantilevering over falsework repeatedly. Beginning at the south abutment, Bethlehem bridgemen first erected out to a 15-ft-high falsework tower; then cantilevered to a tower 60 ft high; then, working from the cantilevered span, they built a third falsework tower 180 ft high. Erection of the bridge continued until the cantilevered deck arrived at a point where the derrick could hoist and place the steel for the south tower.

All falsework towers had to be capable of withstanding coastal winds up to 120 mph.

View from the ground, as bridgemen hitch up a tower leg to be set in place at the north tower. Note the derrick on the cantilevered deck high above.

The derrick traveler hoists a member as steelwork cantilevers far out from the south tower. Steel can be seen rising from the north pier at left. The thinner towers at right are falsework.

He's more than 300 ft up—and so was our photographer! An unusual look down one of the bridge towers.

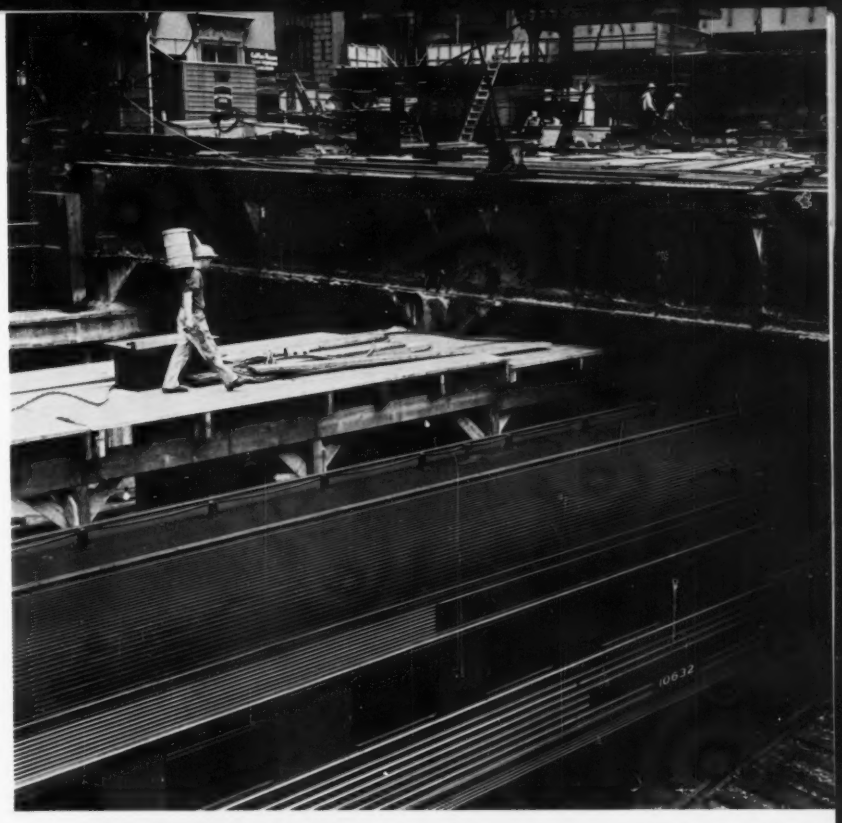
Railroad in the basement!

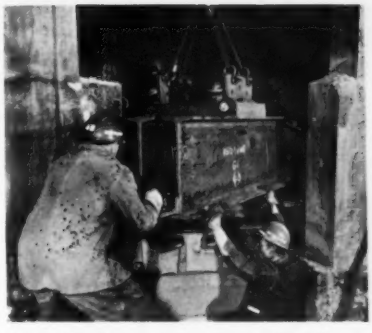
NEW YORK CITY—That's not an HO gauge model railroad. It's a New York Central express passing through the building site as Bethlehem ironworkers erect substructure steel for the Bankers Trust Building.

The 30-story building will occupy leased air space above two levels of operating tracks and rail yard areas. This situation, virtually unique to Manhattan, creates a multitude of problems requiring extraordinary know-how both in structural design and in construction methods.

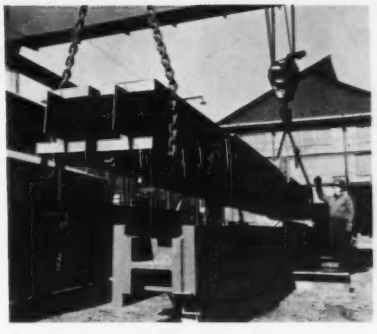
The ultimate objective of the work shown in progress here was to found all columns for the office tower at street grade. This, in turn, required the construction of an elaborate and immensely strong substructure. In the process, Bethlehem crews had to place grillages 55 ft below grade, set substructure columns on them, and then erect ponderous built-up girders which are supported both by the columns and by existing underground steel framing. Highlights of this work are shown in the accompanying photographs.

Occupying the entire blockfront between 48th and 49th streets on the westerly side of Park Avenue, the building will rise 412 ft above grade. Its major tenant, Bankers Trust Company, will occupy some 60 per cent of the structure's 400,000-sq-ft total area.





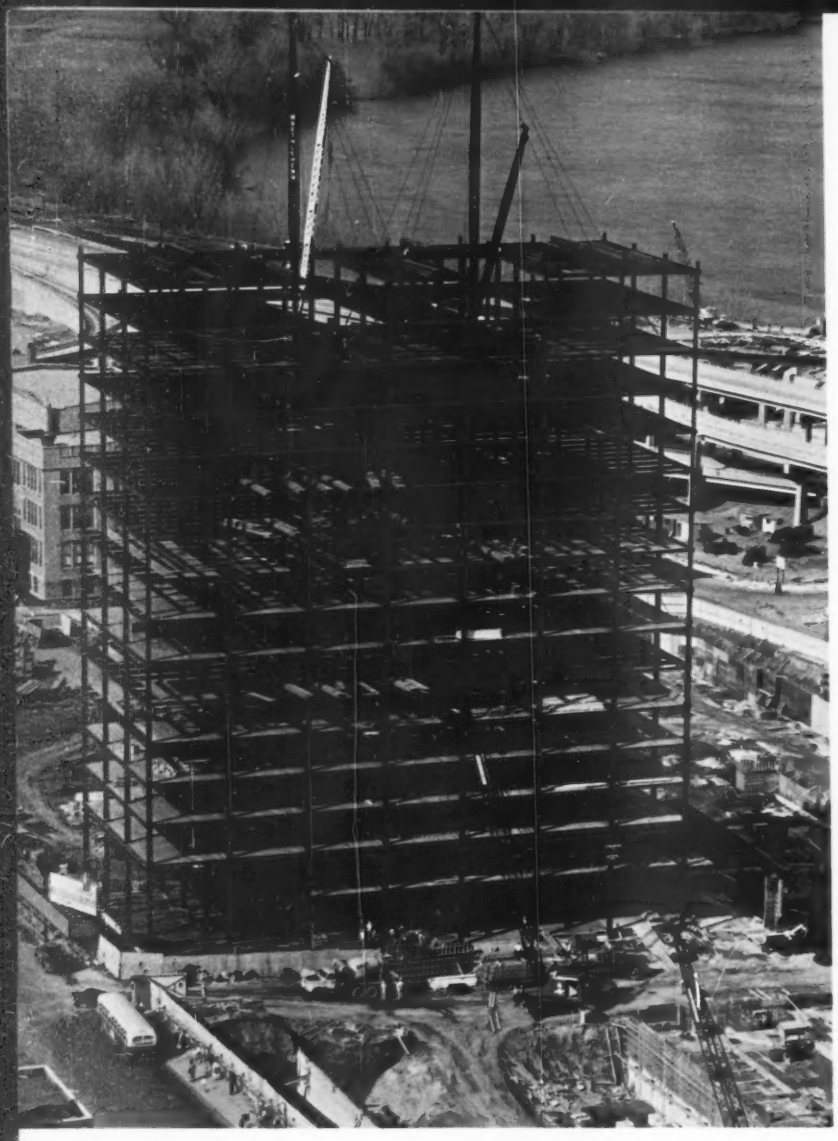
Anybody have a shoe-horn? Bethlehem ironworkers are shown guiding the first steel grillage into position. This one weighed 7½ tons, and just cleared the underground columns.



Steelwork included these heavy girders shown being shipped from our Bethlehem Works. The upper one, a "double-header," comprises two 14-in. WF beams joined by 1½-in.-thick cover plates. The single-beam girder is a 14 WF 426 beam sandwiched between 3-in.-thick cover plates.

Owner-builder: Rose Associates; *co-general contractors:* Diesel Construction Company and Rose Associates; *designer:* Henry Dreyfuss, Industrial Designer; *architect:* Emery Roth & Sons; *structural engineer:* James Ruderman; *interior architects:* Shreve, Lamb & Harmon Associates; *mechanical engineer:* Jaros, Baum & Bolles; *foundation contractor:* Thomas Crimmins Contracting Co., Inc.

BETHLEHEM STEEL



Report from Constitution Plaza

HARTFORD, CONN.—The steel skeleton you see here is for 100 Constitution Plaza, the first major office building to be constructed at this city's 15-acre urban renewal project. Its 18-story framework was topped out in May by Bethlehem ironworkers.

Soon afterward they began raising the 20-story frame for another beauty—the Connecticut Bank and Trust Building. The architect's rendering indicates the finished appearance of this sleek structure.

DESIGN WITH A36 SAVES 150 TONS

The preliminary structural designs for the Connecticut Bank and Trust Company Building assumed the use of A7 structural steel. However, with adoption of the ASTM A36 specification, the engineers re-designed in the newly approved material with impressive results. They calculate a weight saving of about 150 tons, or approximately 1 lb per sq ft. Dollar savings for structural steel were roughly 6 to 7 per cent.

100 Constitution Plaza—
Associated architects: Charles DuBose, Emery Roth & Sons, Richard Roth; *architect for major tenant—Hartford National Bank and Trust Co.:* Jeter & Cook; *structural engineer:* James Ruderman; *mechanical and electrical engineer:* Joseph R. Loring Associates.

Connecticut Bank and Trust Company Building—

Architect for owner: Robert Allan Jacobs, Kahn and Jacobs; *architect for bank:* Carson, Lundin & Shaw; *structural engineers:* Weiskopf & Pickworth; *mechanical and electrical engineer:* Jaros, Baum & Bolles.

Owner-developer for the entire Constitution Plaza project: Constitution Plaza, Inc.;
general contractor: F. H. McGraw & Company.

BETHLEHEM STEEL

Owner: District of Columbia Armory Board;
architects and engineers: Dahl-Ewin-Osborn;
builders: McCloskey & Co.

Teamwork!

WASHINGTON, D.C.—A stiff-leg derrick steadies the upper arm of a welded box frame, while a long-boomed crawler crane hoists a ponderous steel strut into place. Elsewhere in the picture, dwarfed by the colossal steel shapes, welders are at work, and concrete workers prepare the footings for more steel.

That was the sort of teamwork that completed the District of Columbia Stadium for its autumnal occupants—the Washington Redskins. And, come next spring, the Senators will take the field.

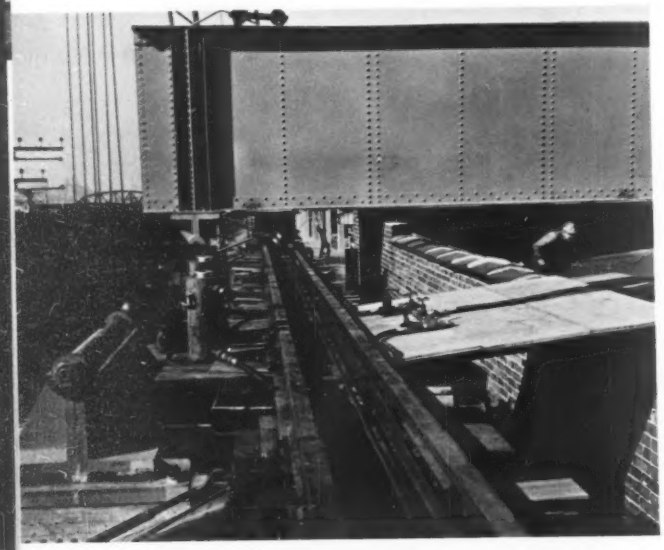
The giant frames you see here are but a few of sixty-six, spaced at 30-ft intervals, that completely ring the stadium, supporting the roof and upper-deck seating. What's more, the frames vary in size, so that the seating rises higher in some areas than others, resulting in a novel undulating roofline. Unlike a conventional stadium, massive and static in appearance, Washington's has an airy, sculptured look that belies its monumentality.

The piece being lifted here is a 6-ton strut, measuring 30 ft by 8½ ft by 2 ft. It's being hoisted by an 80-ton-capacity crawler crane with 140-ft boom and 30-ft jib. The stiff-leg derrick, a 35-tonner with 90-ft boom and 15-ft jib, is mounted on an 85-ft-high tower.

The tapering frames are supported by two columns, pin-mounted on steel shoes. The frames' lower arms cantilever downward as much as 80 feet, and from them is suspended the steelwork for the press boxes. The 75-ft cantilever of the upper arms, connected laterally by wide-flange rafters, supports the roof.

Bethlehem bridges a building

Owner: State of New York, Department of Public Works; *consulting engineers:* Howard, Needles, Tammen and Bergendoff; *general contractor:* Gull Contracting Company, Inc.



Close-up of Bethlehem's method of moving inaccessible ends of the three big girders across portions of the substation. Girder rests on the winch-operated dolly. Hydraulic jacks in the foreground lowered the girder onto the bearing shoe at left.

BRONX, N.Y.—Small wonder it took four crawlers to lift that massive box girder—it's 131 ft long, 11 ft deep, and weighs 164 tons! In fact, it's the heaviest we ever fabricated at our Pottstown, Pa., works. Maneuvering it into place was the highlight of Bethlehem's work in supplying the superstructure steel for eight-tenths of a mile of Bruckner Expressway, a six-lane elevated link in the Interstate Highway System.

But the size of the girder is only part of the story. More unusual is the fact that it and two others had to be positioned directly over an electric substation that lies in the right-of-way, and could not be re-located.

What's more, a railroad cut and high-tension lines along the far side of the building prevented Bethlehem's erection crew from using crawlers to place that end of the girder on its pier. Instead, they put up three 60-ft-high falsework towers, ran heavy stringers over them, topped with a narrow-gage track on timber ties. A winch-operated dolly rode the track. Then came the fun.

First, the girder was raised by two 60-ton crawlers at the far end, and two 100-ton crawlers at the near end. Next, the far end was eased down on the dolly, and the near end was seated on a falsework tower. Then, as the 100-ton crawlers cautiously walked the near end (including the tower, for safety's sake), the dolly was winched along until the entire girder was perfectly positioned over the piers. Finally, two 100-ton hydraulic jacks picked the far end off the dolly, whereupon the huge piece was gently lowered into place.

Simple—when you know how.

Good neighbor bridge

SAULT STE. MARIE, MICH.—High above American soil, Bethlehem bridgemen are shown erecting truss members for the new International Bridge which, when completed, will be 14,595 ft long over-all, with a two-lane roadway elevated 124 ft over busy ship canals.

Bethlehem's contract includes the structure's most impressive portion, a four-span continuous double-arched truss unit with suspended roadway, with two main spans of 430 ft each, and 200-ft sidespans. Roughly 1,400 ft of three- and four-span continuous deck-plate-girder units will extend from the north end of the truss bridge to a pier just south of the International Boundary, where Canadian bridge builders take over.

We began erection at the south-end pier, cantilevering out successively to two lofty falsework bents, then to the southerly main pier. We used an 80-ton-capacity crawler with 150-ft boom and 20-ft jib to build the falsework, erect the traveler (25-ton-capacity with 90-ft boom) and then pass steel up to the traveler.

The erection scheme calls for the same operation to be repeated at the north end, working southward. Meanwhile, a guy derrick erected on the center pier set up two travelers to construct balanced cantilevers 215 ft in each direction. Finally, both spans were closed at their midpoints.

Although erection of the plate-girder spans is not as spectacular, it entails much heavier lifts—as much as 65 tons. The work requires an 85-ton-capacity traveler, aided by a 75-ton materials-handling derrick.

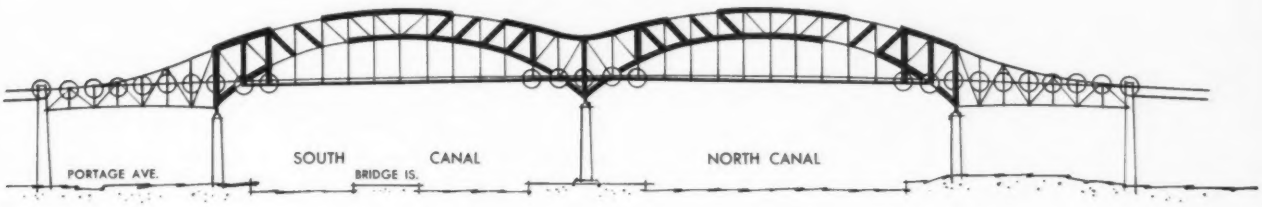
HIGH-STRENGTH STEEL SAVED 15 PER CENT!

It would be expected, of course, that the distinguished design engineers would produce an optimum design based on the criteria of adequacy, safety, beauty, and economy.

The use of ASTM-A440 steel for highly stressed truss members contributed substantially to achieving those goals. The profile sketch indicates the low-alloy truss members, most of which were built up of 15-in. channels with cover plates. All sidespan floor beams, 36-in. wide-flange shapes, varying in weight from 182 to 282 lb/ft, are also ASTM-A440 steel.

The engineers estimate that substitution of this high-strength material for A7 saved approximately 310 tons of dead weight in the American-side truss bridge, and about 170 tons in the Canadian-side three-span truss bridge. Approximate dollar savings were $185,135 and $94,940 respectively, for a total saving of $280,075, or about 15 per cent.

BETHLEHEM STEEL



Profile of four-span continuous arch-form truss bridge with heavy lines indicating use of ASTM-A440 steel in highly stressed verticals, diagonals, and chords. Circles indicate high-strength floor beams used in the suspended roadway. Low-alloy material was deliberately not used in sidespan truss members because to do so would reduce the weight to an undesirable level.

Owner:
International Bridge Authority of Michigan;
design engineer: the late D. B. Steinman;
supervision of construction: Steinman, Boynton, Gronquist & London, Consulting Engineers

BETHLEHEM MOTION PICTURES

. . . of special interest to designers, engineers, builders

These 16mm films are ideal for both professional and social programs. All are color films with sound track, and run about one-half hour. Just send us the accompanying coupon. It is best to apply at least three weeks in advance to assure availability.

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Roadbuilders will be interested in this description of how steel products are used in modern highways.

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The fascination of high-level bridge-building is captured in this film record of construction of a 4-mile bridge including six types of spans.

SKYLINES

This film is of special interest to architects, engineers, and builders. It traces the development of the modern steel-framed skyscraper, and the monumental bridges of our age.

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A technical study of reinforced concrete construction. Highly recommended for practicing designers and engineering students.

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BETHLEHEM STEEL

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Steel

for Strength
. . . Economy
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FIRST LANE elevations are established by grid (arrow) riding on taut line.

SECOND LANE elevations are set by skid riding on adjoining pavement (arrow).

Automatic Control Speeds Paving

An effective automatic grade control for paver screeds promises faster, cheaper paving operations and smoother riding surfaces on asphaltic roads.

The control, long sought by paver manufacturers, has been developed by Minneapolis-Honeywell with the help of the Iowa Manufacturing Company and is being field tested on a Cedarapids paver (ENR Sept. 28, p. 15).

The results are apparently excellent. On an 8-mile stretch of Interstate 80, just east of Iowa City, Iowa, a single paver is placing as much as 5,200 tons of asphaltic concrete in a 12 hour day. Recently, it has been averaging better than 4,700 tons per day, in spite of a few minor "bugs" and a shortage of material. The paver is so fast that the contractor, Highway Surfacers, Inc., of New Hampton, Iowa, has been having trouble keeping the machine supplied, even though it has three hot-mix plants and 30 trucks trying to do the job.

In addition to being fast, the automatically controlled rig is accurate and yet flexible, even in the hands of a relatively inexperienced operator. The controls are so sensitive that they can detect a dime on the roadway but the machine can cover a 4-in.-thick plank with no perceptible variation in the roadway surface.

The control system has six basic components: pendulum, command panel, grade sensor, control box and either two servo motors or two hydraulic pistons, one on each side of the paver.

The pendulum provides a horizontal reference that is accurate to 0.1% of slope.

The command panel, which is about the size of a cigar box, contains two dials and four switches that determine all screed settings and movements. The operator sets the dials for the desired slope and grade, throws two of the switches and the control system takes over the screeds. The operator has only to run the machine and see that it is kept supplied with paving material. The remaining two switches over-ride the automatic unit and permit an operator to adjust the screeds either by manually controlling the switches of the servo motors or by turning the screed handwheels.

In automatic setting the sensor measures the grade. It is mounted on a beam attached to the side of the paver near the ground. For an initial pass the sensor is fitted with a grid designed to ride on a string or wire set at a predetermined elevation just outside the lane to be paved. The pressure exerted by the grid is less than ¼ oz, so its effect in depressing the guide string or wire is negligible. Nonetheless, on the I-80 job the contractor found it necessary to support the line at 50 ft intervals, or less, and to maintain at least a 32 lb pull on it at all times.

In placing material for a lane adjacent to one already finished, the sensor is fitted with a skid that rides on the surface of the finished lane.

Impulses from the pendulum, the command panel and the sensor feed into the control box, which in turn translates them into the desired electrical output for control of the servo motors or the hydraulic pistons.

The Cedarapids machine working on I-80 uses an all electric system, but hydraulic activators are available for manufacturers of pavers using hydraulic systems. New pavers can be built with the system included as an integral component or existing machines can be adapted to its use.

According to Minneapolis-Honeywell, it will be about four months before the automatic paver screed control is commercially available and it can then be purchased only through paver manufacturers.

A Guide to OP and VP

Gurley Optical Plummet

The Optical Plummet Transit opens new avenues in accuracy, speed and convenience...eliminates inconvenience and lost time involved in centering a plummet over a point.

The Optical Plummet is a telescope through the vertical center (spindle) of a transit. It will point vertically when the transit plate is level. The telescope is turned at right angles by a prism, so that vision is actually horizontal. Setting and adjustment may be checked very simply and precisely by rotating the instrument 180 degrees.

The Gurley Shifting Head Tripod permits 1¾" movement of the transit in two directions 90° separated, without material disturbance to the level of the plate (the Optical Plummet thus remains operative through the entire centering procedure).

Advantages of the Gurley Optical Plummet Transit

- Saving in set-up time, as much as 33%—a factor when a crew is waiting.
- Eliminates swaying plumb bob.
- More accurate centering over point.
- On construction work—sights on points some distance below, such as encountered in bridge work and building construction.
- Made in U.S.A.—Little servicing, but easily repaired when necessary.

Gurley Optical Plummet Transits Available in 21 Combinations

With Circular Compass	With Trough Compass	Without Compass
OP-52	—	OP-57
OP-62	—	OP-67
OP-132	OP TC 137	OP-137

And with limb reading to 1 min.; or 30 sec., or 20 sec. . . . Stiff-leg or Extension-leg Tripods with Constant-Level Shifting Head and wide frame European-type construction.

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At high power:
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- blacks and whites stand out

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- greater field
- brighter field
- decrease of heat waves

We will be pleased to send you further information about both Gurley Optical Plummet Transits and Gurley Variable Power Eyepiece.

Both Optical Plummet and Variable Power are patented.

W. & L. E. Gurley • Union Plaza, Troy, N. Y.

. . . New Product Briefs

Measuring Tapes

Line of precision measuring tapes, metalic and nonmetalic woven linen, 50 and 100-ft lengths graduated in feet, tenths and half tenths; also in feet, inches and quarter inches. Plastic coated. Price of 50-ft tape is $13.75; 100 ft, $21.75. Koh-I-Noor, Inc., Bloomsbury, N. J.

Utility Pump

For solvents, slurries and liquids with solids up to ¼ in. in dia. Double diaphragm pump operates on air or gas pressure from 5-100 psi. Capacity up to 60 gpm. Texstream Corp., 320 Hughes St., P. O. Box 9127, Houston 11, Texas.

Concrete Tester

CT-710-B tests compressive strength of 6-in.-dia concrete cylinders or 6-in. cubes. Calibrated to an accuracy of 1% of indicated load. Load capacity is 125 tons, can be applied at constant rate between 25 and 50 psi per second. Soiltest, Inc., 4711 W. North Ave., Chicago 39, Ill.

Builders' Level

With slight head movements, operator can view telescope level, bull's-eye level, read the circle and look through the telescope. Focusing drive is rack and pinion. Kern Instruments, 120 Grand St., White Plains, N. Y.

Cable-Laying Device

For use on Caterpillar track-type tractors that have hydraulic controls. Handles cable or wire up to 3½ in. OD. Lays cable to depths from 1 ft to 6 ft. Vertical and lateral movements are hydraulically controlled. Kelly Products Div., Crutcher, Rolfs, Cummings, Inc., Houston, Tex.

Band Saw

Little G, portable metal-cutting band saw, weighs 42 lb, has 7 x 25¼-in. bed. Cuts to within 0.005 in. Takes 3½ x 6 in. stock; angle cuts to 45 deg on sizes up to 3½ x 3 in. Counterbalanced cutting assembly. Standard blades 59 x ½ x 0.020 in. Griscer Industries, Inc., Garrett, Ind.

Roof Coating

Silicones have been added to Monroe Asbestolite aluminum roof coating, to increase water and weather-resistance characteristics. The Monroe Co., Inc., Dept. 55, 10713 Quebec Ave., Cleveland 6, Ohio.

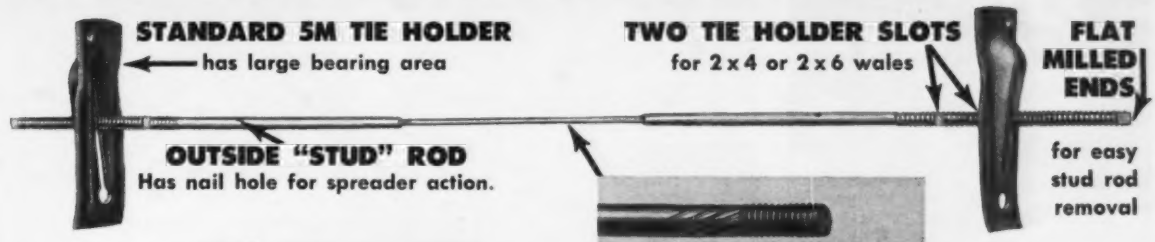
Diaphragm Pumps

Gas or electric motors power 14 pumps in the line with capacities from 1,000 gph to 17,000 gph. Speed reduction by enclosed bronze cut tooth gears. Swing or ball check valves. Wheel or base mounted. Rice Pump & Machine Co., Belgium, Wis.

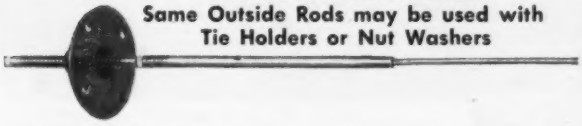
SUPERIOR'S NEW COMPACT, ECONOMICAL FORM TIE

"SUPERTIE" Assembly

with Tie Holders or Nut Washers


STANDARD 5M TIE HOLDER
has large bearing area
TWO TIE HOLDER SLOTS
for 2 x 4 or 2 x 6 wales
FLAT MILLED ENDS
for easy stud rod removal
OUTSIDE "STUD" ROD
Has nail hole for spreader action.

With NUT WASHERS
Same Outside Rods may be used with Tie Holders or Nut Washers



The Superior SUPERTIE Assembly consists of two outside rods, two standard 5M tie holders, or two nut washers. Together with the high-strength Inside Tie Rod (SUPERTIE), this compact assembly offers great economy and versatility over conventional tieing systems. The Outside Rod will accommodate either tie holders or nut washers on 2 x 4 or 2 x 6 wales. For easy removal the ends of the Outside Rod are flattened. Another feature, the nail hole, provides for fast and convenient form spreader action. Only the SUPERTIE, left in the concrete, is lost . . . the working parts of the assembly are reused again and again.

The Inside Tie Rod (SUPERTIE) is the KEY TO THE ECONOMY of this system.

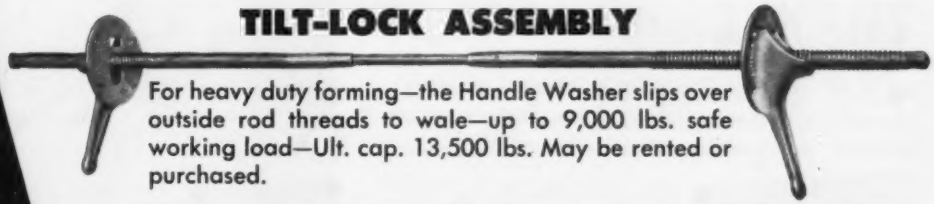
There is no excess material. Has a fast double-lead thread for connection to outside stud rods—only 5 turns for full engagement.

Rented With Option to Purchase

This tie system has been designed for compactness, all excess weight and bulk have been eliminated, yet it has a Safe Working Load of 5,000 lbs. (7,000 lb. ultimate capacity.) *Write for Bulletin SA-1.*

SUPERIOR Heavy Duty Form Tie Assemblies

TILT-LOCK ASSEMBLY



For heavy duty forming—the Handle Washer slips over outside rod threads to wale—up to 9,000 lbs. safe working load—Ult. cap. 13,500 lbs. May be rented or purchased.

NUT WASHER ASSEMBLY

For contractors that prefer a spun washer. A heavy duty type—capacities are the same as Tilt-Lock Assembly above. Also rented or purchased.

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Pacific Coast Office and Plant
2100 Williams St., San Leandro, Calif.

Imaginative masonry...

Meekins, Inc., manufacturers of concrete masonry units, had this new headquarters designed to show the architectural possibilities of their products. Lehigh Mortar Cement was used to lay up the units.

Precast concrete risers, floor units and hand rail were used in this attractive entrance. Prestressed double tee units for the roof made this an all-concrete building.

• Inside and out, this attractive commercial building is all concrete. The designer blended a variety of masonry units—such as shado-wal, solar screen, ordinary block—into an interesting, functional structure.

More and more, architects and builders are developing the exciting design possibilities of modern concrete masonry. Today's array of strong, light units in myriad sizes, shapes and textures serves both structurally and decoratively—in all types of buildings.

And remember, when you build with concrete masonry, use Lehigh Mortar Cement. Its plasticity and workability make it easier for masons to do a good job — help assure clean, strong, weather-tight walls.

Lehigh Portland Cement Company, Allentown, Pa.

Screen block gives needed protection from sun's glare. At night screen is back-lighted with colored lights. Lehigh Early Strength Cement was used in the manufacture of all units.

LEHIGH CEMENTS

Owner: Meekins, Inc., Hollywood, Fla.
Architect: Kenneth J. Spry, Hollywood, Fla.
Contractor: Ralph S. McComiskey, Hollywood, Fla.

Schlenz Heads Pollution Group

The Water Pollution Control Federation, meeting in Milwaukee this week, will install Harry E. Schlenz as president. He succeeds Ray E. Lawrence partner in Black & Veatch, a Kansas City consulting firm. Installed as vice president is Jack E. McKee, professor of sanitary engineering at California Institute of Technology.

Though born in Denver, Mr. Schlenz has been an Illinois man most of his life. He earned his B.S. in sanitary engineering at the University of Illinois in 1927, and his M.S. in civil engineering there two years later. After a year of teaching sanitary engineering at Illinois, he joined the Pacific Flush Tank Co., sewage treatment equipment manufacturers in Chicago. He is still there, as president.

He has become a leader in water pollution control. Besides being the Federation's vice president last year, he has been on the board of directors twice (1952-55 and 1959-61).

He has been vice president and president of the Water and Sewage Works Manufacturers Association and on the board of governors of that group since 1951. (Last year he represented them on the steering committee of the National Conference on Water Pollution.)

Harry E. Schlenz

Other groups he is active in are the American Water Works Association, American Society of Civil Engineers, American Public Works Association, Central States Sewage and Industrial Wastes Association and the Illinois Society of Professional Engineers.

Briefs . . .

Business

Henry Van Loon, one time executive director of the Pennsylvania State Planning Board, has joined the Chicago architectural firm of Perkins and Will. Based in White Plains, N. Y., he will participate in the firm's urban design practice.

Robert D. Dewell has been named chief engineer of J. H. Pomeroy and Co., Inc., San Francisco contractors and engineers. A past president of the San Francisco Section, ASCE, he has had his own consulting practice there for the last 17 years.

Richard A. Haber, former chief engineer of the Delaware State Highway Department, has been elected vice president of Franklin Associates, Inc., a Wilmington, Del. building firm.

W. E. Arthur, vice president of Bechtel Corporation, a San Francisco engineering and construction company, has been named head of the corporation's newly formed permanent organization in New Zealand and Australia with executive headquarters in Melbourne.

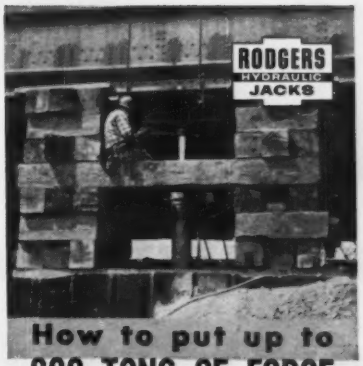
George Gleeson, dean of the School of Engineering at Oregon State University, is the new president of Oregon Research Associates, Inc., a non-profit corporation formed to expand research activity in the state.

Public Works

Col. Walter L. Winegar, former Army District Engineer in Portland, Oregon, has been assigned as engineer officer with the U. S. Military Assistance Advisory Group at Saigon, Vietnam. He was replaced by **Col. Sterling K. Eisiminger.**

Assignment of the following new District Engineers has also been announced by the Army Corps of Engineers: **Col. Edward B. Jennings,** New Orleans; **Col. R. C. Pfeil,** Detroit; **Lt. Col. Daniel A. Raymond,** Mobile; and **Lt. Col. Leon J. Hamerly,** Buffalo.

Dr. Charles L. Wilbar, Jr., a Pennsylvania health administrator, has become chairman of the Ohio River Valley Water Sanitation Commission, the eight-state coordinating agency for abatement of water pollution in the valley. He succeeds **Ross H. Walker** of Richmond, Va.



How to put up to
600 TONS OF FORCE
at your fingertips

RODGERS hydraulic jacks give you tons of brute-force for driving culvert or sewer casings . . . jacking heavy loads . . . leveling overhead forms . . . and countless other pushing, pressing, or pulling jobs. RODGERS offers you all types and sizes, 50 to 600 tons — manual or powered, single or double-acting. Use them singly or in groups. Prompt delivery. Write for detailed bulletin.
J-1030

RODGERS HYDRAULIC, INC.
Pioneer in high-pressure hydraulics, since 1932
7401 Walker St. • Minneapolis 26, Minn.

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TUNNEL FORMS

Adjustable box forms for 13'x9', 11'x9', 8'x8', and 6'6"x6'6" sewers. Also round forms, air locks, jumbos, head frames and other tunnel equipment.

For FREE illustrated catalog showing job applications, write:

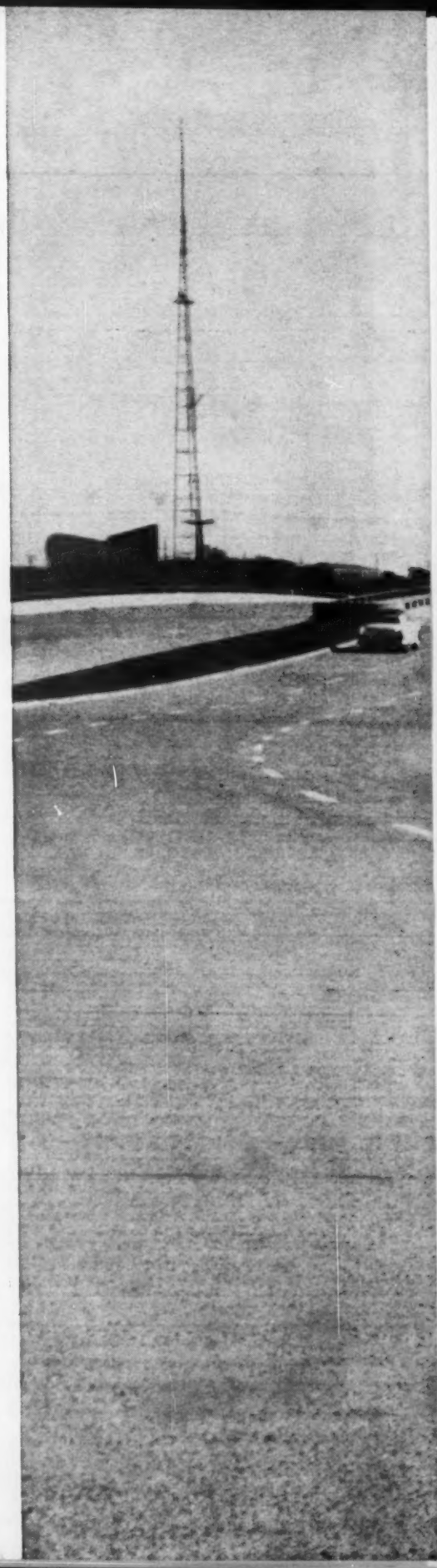
POSEY IRON WORKS INC.

Custom Fabrication For Over 50 Years

DIVISIONS:
• Iroquois Asphalt Plants • Mixers and Blenders
• Tunnel Forms • Industrial Heating • Foundry
• Large OD Steel pipe

561 S. PRINCE STREET LANCASTER, PA.

Texas' 352 miles of Interstate awarded to concrete promise big savings in upkeep!



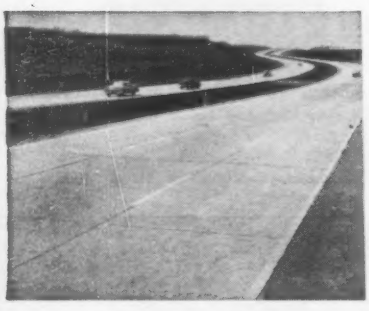
Across Texas, these modern concrete highways are steadily growing in length. They will long be a public reminder of the skills and dedication of the engineers and builders who are creating them.

A solid future is built right into roads like these. Only concrete has load-bearing strength that can be matched *mathematically* to future traffic needs. Only concrete enables engineers to design pavements to last 50 years and more.

Concrete isn't flexible, so there are no "moving parts" in it to cause hidden wear. And even with the highest temperatures, it won't soften and ripple under traffic. Concrete can't oxidize. There's never adverse chemical reaction to sun, cold, air or moisture. Concrete actually grows stronger year by year.

All these advantages mean extra thrift for Texas as it builds with concrete: Exceptional pavement life . . . upkeep costs that run far less than for asphalt. It's for reasons like these that most Interstate mileage across the nation today is going to concrete.

At right: Texas Interstate 35E, Stemmons Freeway out of Dallas.
Below: Texas Interstate 20, Dallas—Ft. Worth Turnpike.

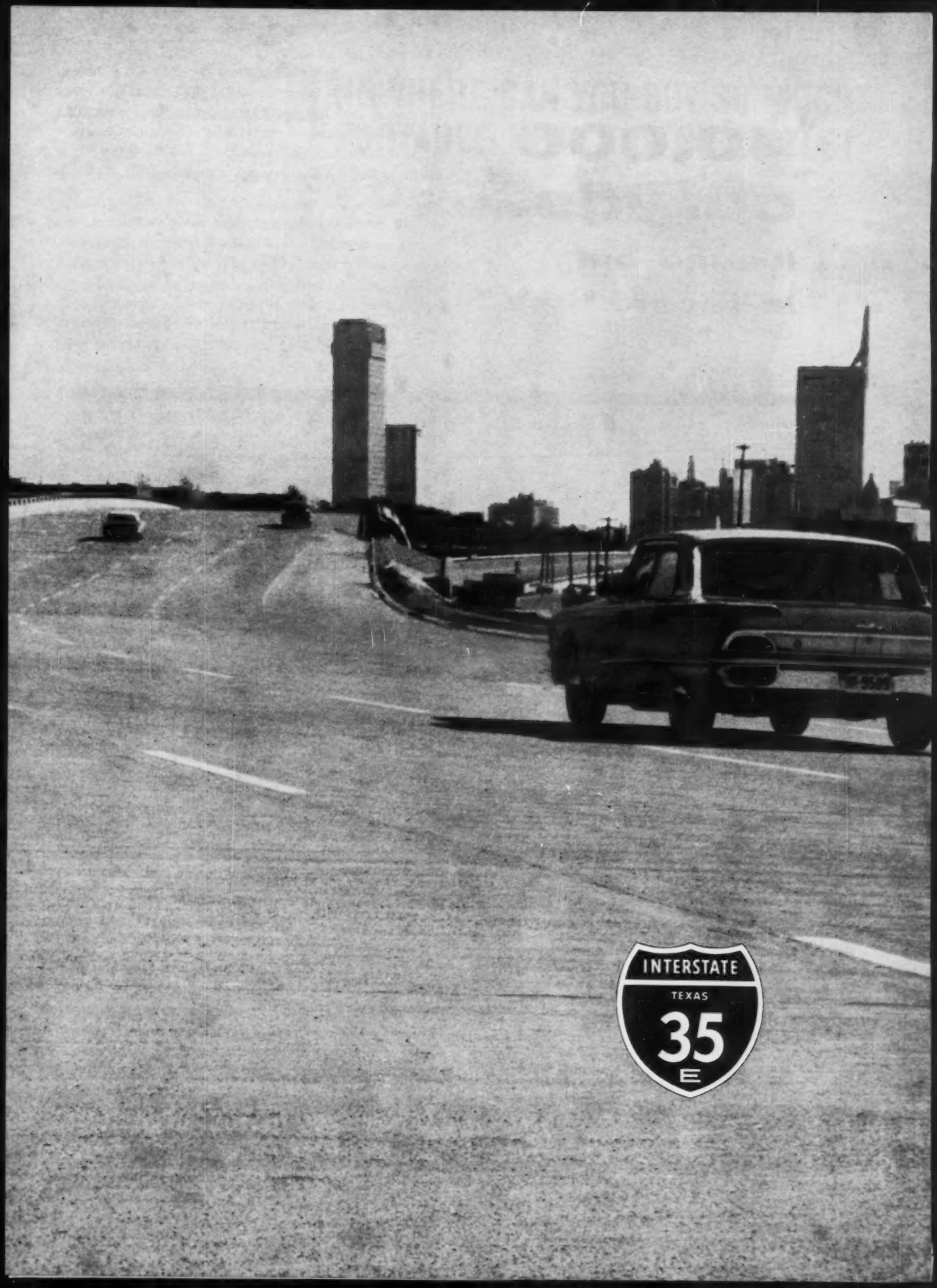


38% maintenance saving with concrete, Texas' 31-year records show!

Official Texas State Highway Department records give the facts: Since 1929, road maintenance costs per mile per year for concrete have averaged $144.68; for asphalt, $235.23. Texas' new concrete highways will do even better!

PORTLAND CEMENT ASSOCIATION

A national organization to improve and extend the uses of concrete


INTERSTATE
TEXAS
35
E

"40,000 cu. yds. loaded out in record time"

. . . say field reports about these two BAY CITY shovels. Owned by K & R Construction Co. of Camillus, N. Y., they are loading bank run gravel for use as sub-base material on the Empire Stateway Interstate Route at Syracuse. Fourteen trucks are needed to keep up with the two machine's output of 2300 to 2500 cubic yards per 8-hr. day.

You can't help admiring a BAY CITY'S digging ability. Smooth, balanced power is provided through a fluid coupling and speed reducing unit of helical cut gears running in oil. A one-piece continuous chain with automatic adjuster gives positive, powerful and independent crowd action. Power-operated retract is twice as fast as crowd . . . provides positive control of dipper handle throughout the dig-swing-dump cycle. Mechanical power-controlled boosters set the main

drum clutches with minimum effort. Smooth acting swingers are engaged through needle bearings on hardened tapered keys — a combination that means quick response, fast swing.

BAY CITY crawler machines are offered as ¾- to 1½-yd. convertible excavators and as 20- to 30-ton erecting cranes. Truck-mounted CraneMobiles, with lifting capacities of 25- to 40-ton, are also available. Ask your local BAY CITY dealer to give you the complete story. Do it today!

BAY CITY SHOVELS, INC.
2611-B Center Ave.
BAY CITY, MICHIGAN

a subsidiary of Unit Crane & Shovel Corp.

Obituaries

Bernard T. Converse, 86, a Philadelphia consulting engineer who formerly spent 22 years with the Baldwin Locomotive Works.

John M. McCullough, 51, executive director of the Delaware River Port Authority. Before joining the Authority in 1953, he was a writer for THE PHILADELPHIA INQUIRER for many years.

Edward M. Knapik, 63, partner in the San Francisco consulting firm of Huber & Knapik. A University of California graduate, he was the principal structural engineer on many Bay Area projects during his four-decade association with Walter L. Huber.

William H. Trinkaus, 74, chief engineer of the Metropolitan Sanitary District of Greater Chicago until his retirement in 1954. He joined the organization in 1909.

Jerome G. Harrison, 78, head of the specifications department of the Ballinger Co., architects and engineers of Philadelphia. A member of the Emergency Fleet Corp. during World War I, he later was associated with Horace Trumbauer and the John M. Gill Construction Co. in Philadelphia. He was a graduate of Texas A. and M. College and received a degree in architecture from MIT.

Frank G. Fowler, 89, retired New York civil engineer and builder. A graduate of Cooper Union and Columbia University, he worked for New York City before undertaking his own consulting practice and later forming a construction company.

Charles A. McClure, 72, secretary of the Oregon Capitol Planning Commission and a pioneer city planner in the Northwest. He formerly served with the Portland Planning Commission and the National Resources Planning Board.

Roy G. Livingston, 55, partner in Town & Country Engineering Co. of Cleveland. Formerly he was with the engineering section, Ohio State Highway Department, for 25 years.

Henry R. Fine, 53, a consulting engineer with the Indianapolis firm of A. M. Kinney Co.

Roy L. Williamson, 69, former city engineer, city manager, commissioner of public works, and superintendent of the water department of Raleigh, N. C. He was a civil engineering graduate of North Carolina State College.

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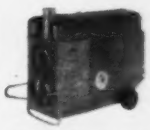
NEW! HERMAN NELSON HEAT GENERATORS

Hurry up heat when you want it—volume air circulation • Engineered for safe, quiet operation • Automatic ignition, automatic temperature control • 16 hours continuous operation • Burn kerosene, #1 or #2 fuel oil • Stainless steel combustion chamber • Controls and handle on cool end of machine • Complete combustion—no fumes, smoke or open flame • Use wherever you need quick, safe portable heat. A DEMONSTRATION WILL CONVINCE YOU!

Unique swirl combustor—maximum fuel economy.

America's most complete line



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UTILITY Interchangeable gasoline engine or electric motor. Up to 425,000 BTU.

HN 850 125,000 BTU

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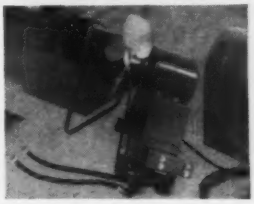

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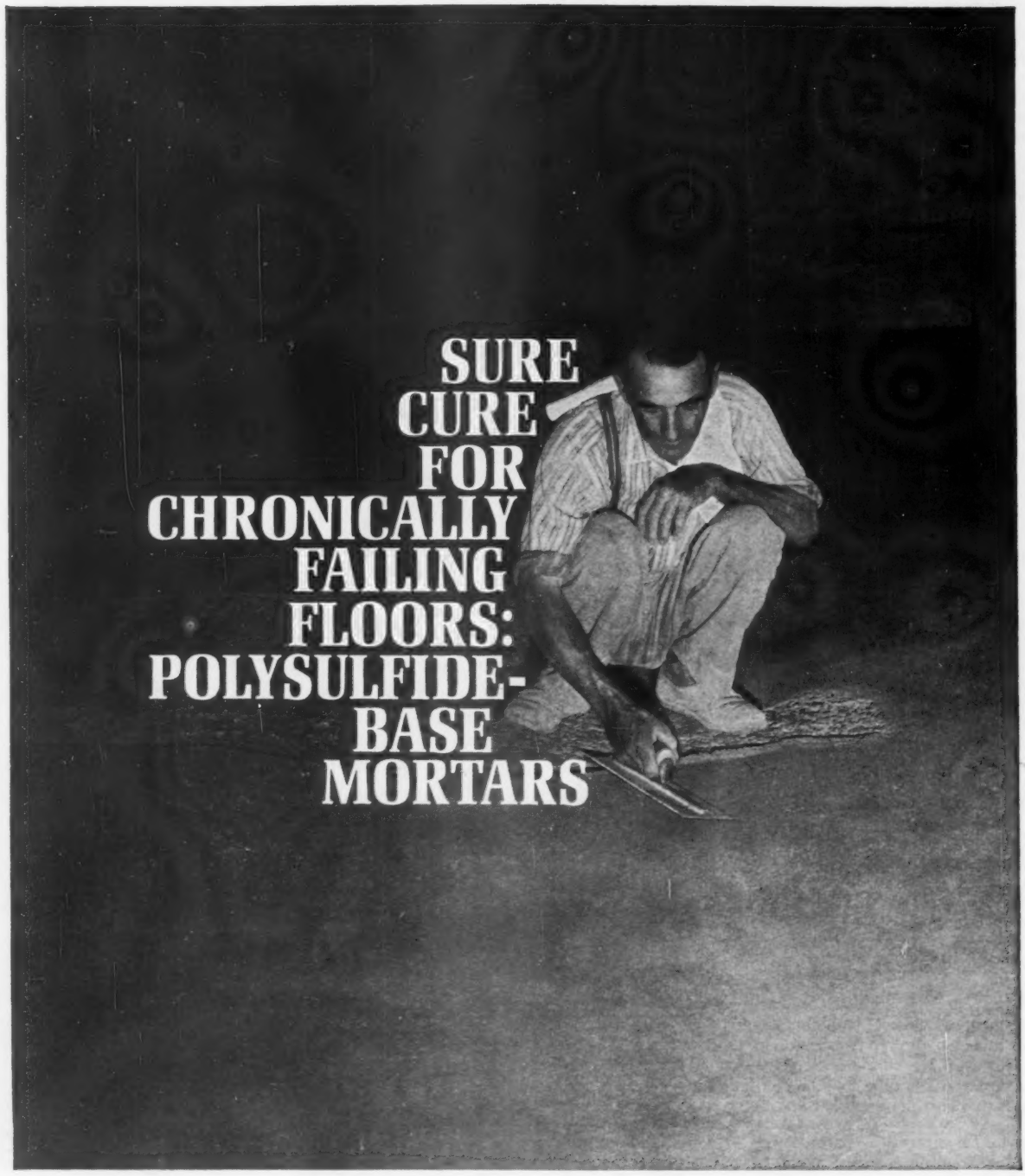

In more and more industrial buildings where manufacturing processes have raised havoc with conventional floors and have caused a continuing cycle of restoration, THIOKOL polysulfide-base flooring compounds are delivering long trouble-free service and decreasing maintenance costs.

THIOKOL polysulfide polymer is synthetic rubber in liquid form. It is famous for spectacular adhesion, elasticity, and resistance to oils, solvents, acids, chemicals, water and temperature extremes. As a mortar base with epoxy, it stands up to heavy traffic, abrasion, chemical attack like no other flooring compound. It can be applied over existing surfaces regardless of their composition, and has proven its serviceability in scores of installations.

Polysulfide-base mortars provide a smooth or skidproof surface, as desired—are ready for traffic in less than one day—and last for years under abusive wear and exposure to disintegrating elements. For full information, write to Thiokol Chemical Corporation at address below, for Brochure FC-100.

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Highway underpass is included in . . . .

Texas Runway Extension Job

This $2,411,937 contract adds a 2,600x150-ft concrete runway extension with parallel taxiway and run-up pad to the North-South runway, Ft. Worth International Airport. Highway 183 will pass under the extension through a $1,386,000 highway tunnel with McPhilben fixtures. The job also includes airport lighting, landscaping, and miscellaneous construction.

A joint venture of Austin Bridge Co., Dallas, and Worth Construction Co., Ft. Worth, took the award 1.4% under the second low, Cage Bros., San Antonio, and 6.1% under the high of eight bidders. Carter & Burgess, Ft. Worth, are the engineers for the city of Ft. Worth.

Unclassified excavation, 598,378 cu yd, accounts for 10.3% of the award. Prices run from low of $0.34 to a high of $0.60 a yard.

Prices for concrete pavement range from the Austin-Worth bid of $3.99 a unit to a high of $4.40 for 33,070 sq yd of 9 in. pavement and from $4.77 to $5.33 a yard for 54,250 sq yd of 11 in. Concrete for the maintenance area ranges from $2.85 to $5.18 a sq yd for 256 yards of 6 in. pavement. And sidewalk concrete ranges from $0.52 to $0.80 a yard for 273 sq yd. Pavement concrete is class C (FAA std specs); structural concrete is class A (3,000 psi).

Some difficult tunnel foundation problems were solved by placing 36 in. drilled shafts on 42 in. centers for outer wall foundations, and 48 in. drilled shafts on 54 in. centers for center wall foundation.

Reinforced concrete culvert pipe (class III) prices range from $18.60 to $29.00 a ft for 340 lin ft of 54 in., from $10.00 to $19.00 for 70 ft of 36 in., from a low of $7.50 to a high of $16.40 for 980 ft of 30 in., from $5.50 to $10.00 a unit for 400 lin ft of 21 in., $4.00 to $7.20 for 400 ft. of 18 in. pipe, and from $3.50 to $5.60 a ft for 496 lin ft of 15 in. culvert pipe.

The extension will stretch the North-South runway to a total length of 9,000 ft. Materials for the job can be transported to the construction site by highway. The airport is located 4 mi from the railhead.

Wage rates in the Fort Worth area include: common labor, $1.90/hr; carpenter, $3.425; ironworkers, structural-$3.625, and reinforcing-$3.375; cement finisher, $3.50; and electrician, $3.625.

The bidding included:

1C Austin Bridge Co., Dallas, Tex., and Worth Const. Co., Ft. Worth, Tex.	$2,411,937
2 Cage Bros., San Antonio, Tex.	2,445,017
3 H. B. Zachry Co., San Antonio, Tex.	2,567,776
4E Carter & Burgess, Ft. Worth, Tex.	2,488,659

Bids: 6-27-61 Items	Unit	Quantity	Unit Prices 1C	2
Highway tunnel, base bid-Westinghouse fixtures	ls	job	$1,365,000	$1,210,000
alternate-McPhilben fixtures*	ls	job	1,386,000	1,230,00
Clear & grub	acre	18.7	745.00	1,000
Exc, uncl	cy	598,378	0.415	0.50
Embankment, special	cy	18,000	0.20	0.12
Concrete pvmt removal, existing airfield	sy	6,010	0.70	1.20
highway	sy	620	0.65	1.20
Exc, borrow	cy	88,760	0.50	0.50
Subbase, crse	cy	19,939	3.30	3.30
Aggr, crushed, base crse	cy	285	5.95	8.00
Conc sidewalk, 5"	sf	273	0.52	0.60
Bit surface crse, 4"	sy	1,667	1.79	1.50
Conc pvmt, maintenance area, 6"	sy	256	3.90	2.85
9"	sy	33,070	3.99	4.27
11"	sy	54,250	4.77	5.21
Curb & gutter	lf	198	1.79	2.10
Bit prime coat	gal	670	0.20	0.30
Paint, runway & taxiway	ls	job	2,950	3,000
Fence, wire stock, 5'	lf	6,957	0.40	0.40
chain link, 5'	lf	6,648	1.52	1.50
Gates, chain link, driveway	ea	1	110.00	100.00
walkway	ea	1	54.00	50.00
stock, driveway	ea	1	65.00	60.00
RCP, culvert, cl III, 54"	lf	340	18.95	20.00
36"	lf	70	11.33	10.50
30"	lf	388	9.35	8.25
24"	lf	980	7.70	6.25
21"	lf	400	5.34	5.25
18"	lf	400	4.27	4.75
15"	lf	496	3.74	4.00
Pipe, conc, std non-reinf underdrain, 6"	lf	1,220	1.07	1.00
Backfill, porous, tp 2	cy	68	4.81	8.00
Drainage str, A	ea	3	294.00	150.00
A-M	ea	2	304.37	200.00
B	ea	1	350.00	200.00
sq drop inlet, 4'	ea	1	347.10	250.00
special inlet, #6	ea	1	828.00	800.00
flumes	ea	3	961.00	800.00
inlet str # 3	ea	1	133.00	200.00
conc, headwall, # 1	ea	1	357.00	200.00
special headwall, #2, 24"	ea	1	96.00	200.00
MH, std	ea	1	571.00	300.00
Seeding	acre	56	165.00	100.00
Sprigging	acre	29	350.00	200.00
Sodding, solid	sy	252	2.00	2.00
strip	sy	70	3.00	2.00
Top soil	cy	31,000	0.50	0.42
Lgts, stake mounted, runway	ea	30	80.90	80.00
taxiway	ea	70	80.90	80.00
base mounted, relocate, runway	ea	10	73.00	80.00
taxiway	ea	7	73.00	80.00
Duct, electrical, undergrnd, 2-way, 4"	lf	330	3.26	3.00
4-way, 4"	lf	316	5.16	4.50
single, PVC, 2"	lf	760	1.15	1.00
Trench, cable	lf	16,180	0.222	0.20
Cable, single cond #8, in duct	lf	4,220	0.38	0.30
in trench	lf	17,720	0.244	0.20
Lgting vault, runway, modify	ls	job	1,500	1,500
MH, electric	ls	job	647.00	750.00
Lgting, tunnel approach	ls	job	17,000	16,000
Drilled shaft, 24"ϕ	lf	284	4.40	10.00
36"ϕ, tp 1	lf	847	13.30	23.50
tp 2	lf	1,386	15.00	25.70
tp 3	lf	3,147	14.50	31.50
48"ϕ	lf	2,286	19.00	35.00

* award based on alternate

Completion time: 500 working days
Liquidated damages: $100 per day

ENR Constr. Cost Index (1913=100) 20-cities avg.—880.38

Save time . . . cut concrete forming costs . . . Be sure of results with . . .

DAYTON SURE-GRIP Accessories

Concrete forming costs going up? We can help you bring them down with a combination of technical service, a complete line of accessories of recognized quality, and fast, reliable service from a *single* source. That source is your nearby DSG Distributor. He can help you eliminate delays and mistakes in planning, procurement and form production.

Cut your forming costs . . . have the dependable accessories you want when you want them by relying on Dayton Sure-Grip. Write today for our free catalog and prices.

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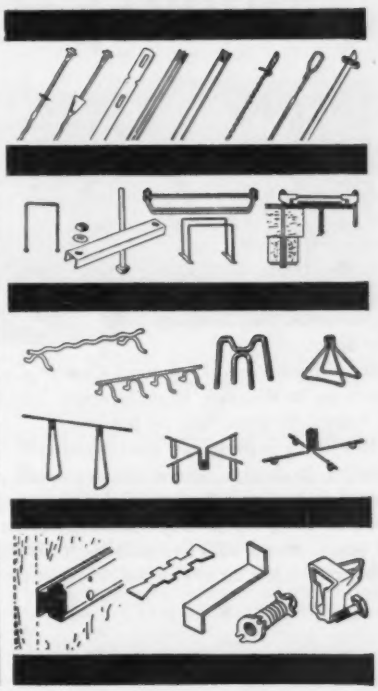
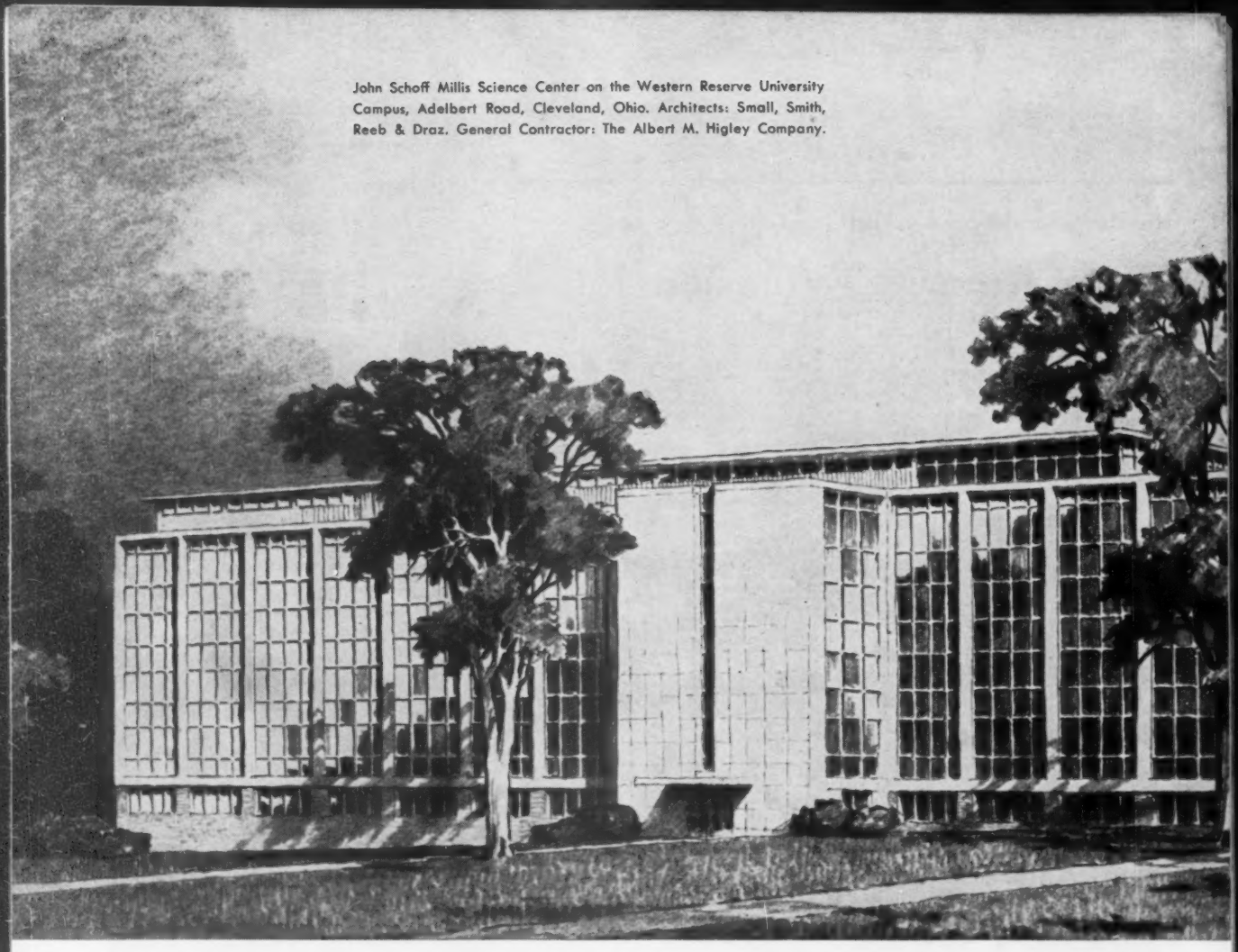


John Schoff Millis Science Center on the Western Reserve University Campus, Adelbert Road, Cleveland, Ohio. Architects: Small, Smith, Reeb & Draz. General Contractor: The Albert M. Higley Company.



Republic products in the new

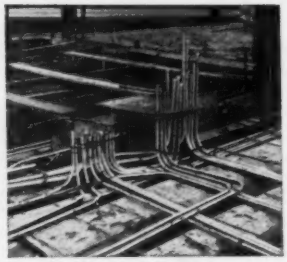
STRONG

More than 17,700 Republic High Strength Structural Bolts went into the five-floor science center, tying friction joints together with sure strength . . . speeding structural erection . . . keeping costs down.

Mr. Richard Nowak of Vogt-Conant Co., steel erectors, reports on a Republic High Strength Bolt advantage that was especially important on this job:

"We were putting up steel within 20 feet of existing university buildings where classes were in session. This created a greater than normal noise problem which we solved by using high strength bolts rather than rivets. We've had good success with Republic High Strength Bolts . . . no trouble on this job, or any of the others where we used them."

ECONOMICAL



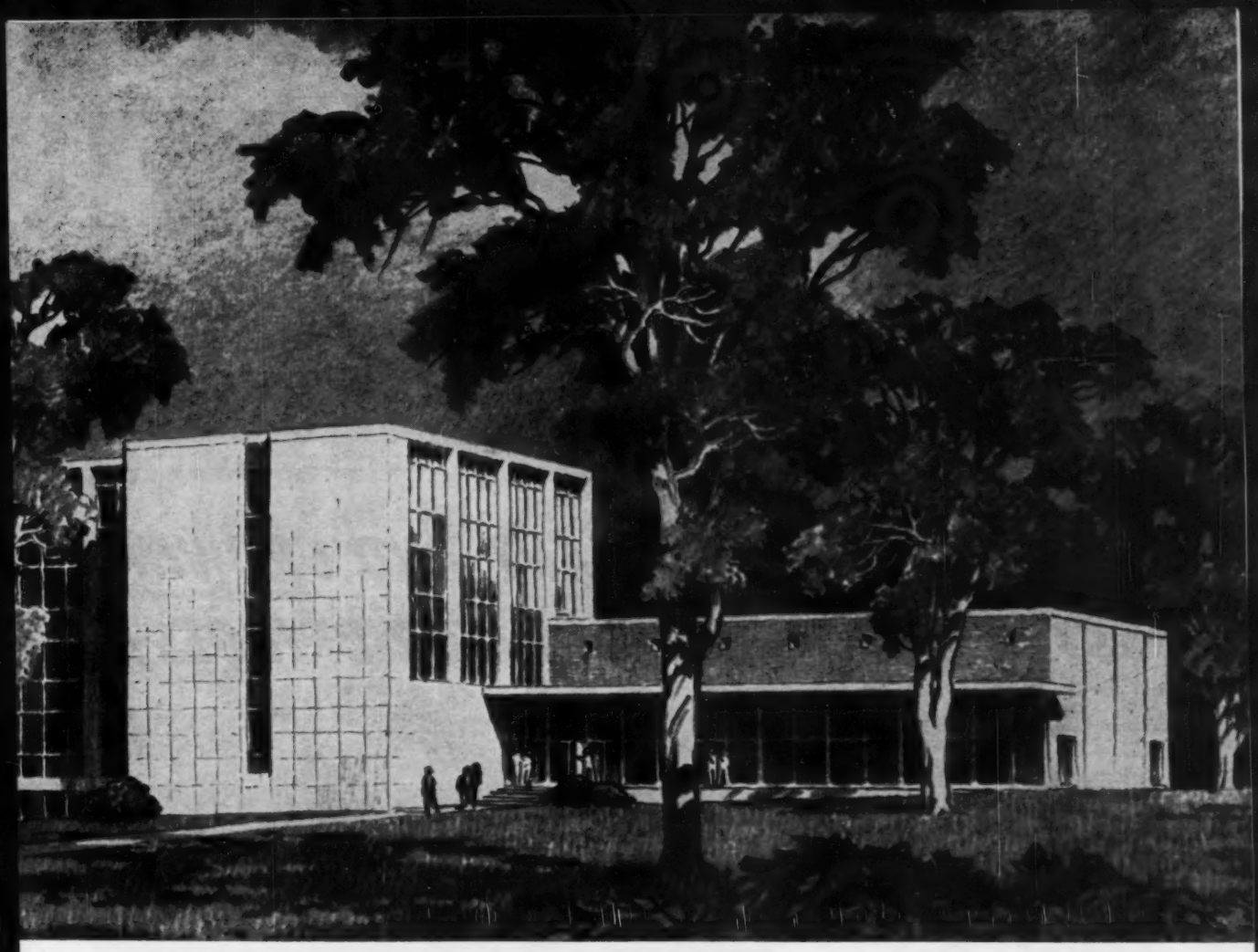
The Western Reserve installation proved again why Republic ELECTRUNITE E.M.T. is the conduit contractors talk about when they say—The *Best* Costs *Less* Installed.

Over 95,000 feet of Republic E.M.T. went into the job. Easy installation features of ELECTRUNITE include: "INCH-MARKED"® for fast measuring, "GUIDE-LINED"® to keep bends in the right plane, and "INSIDE-KNURLING" with "SILVERSLICK" that makes wire pulling up to 37% easier.

Mr. Joseph Martien, vice president of Martien Electric Co., electrical contractors, says: "We've used Republic E.M.T. for about four years . . . have had fine results on this Reserve job and a variety of others. One thing our men like is the easy wire pulling they get with Republic."

Strong
Modern
Dependable

Steel



Western Reserve Science Center...

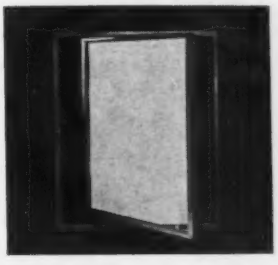
LASTING

Chemistry, physics, and biology laboratories, among the facilities housed in the new science building, required pipe that could stand up under constant use and severe corrosive conditions.

Republic Steel Pipe was selected for these laboratory waste lines, because of its lasting durability and economy. Republic was also used for vents, and for heating and air conditioning piping.

Mr. Anthony E. Lavelle, president, Gorman-Lavelle Co., plumbing contractors, notes: "Republic Pipe used on this job, consisting of 105 tons of galvanized and black pipe, had uniform, high quality . . . was delivered clean, rust-free and on time."

BEAUTIFUL



Truscon Vertically Pivoted Aluminum Windows add to the center's modern beauty and serviceability . . . offer quality you would expect only in much higher priced windows. They rotate 360 degrees for low-cost cleaning, lock automatically in reverse position for maximum safety, and are double weather-stripped for greatest efficiency in heating and air conditioning.

The complete installation will include 545 Truscon Windows.

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Please send more information on the following products:

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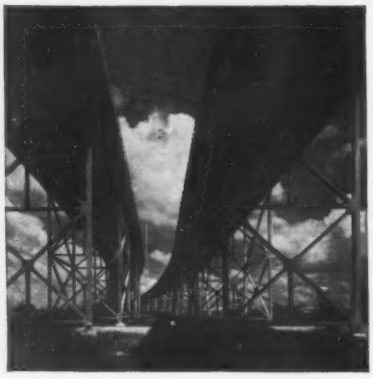
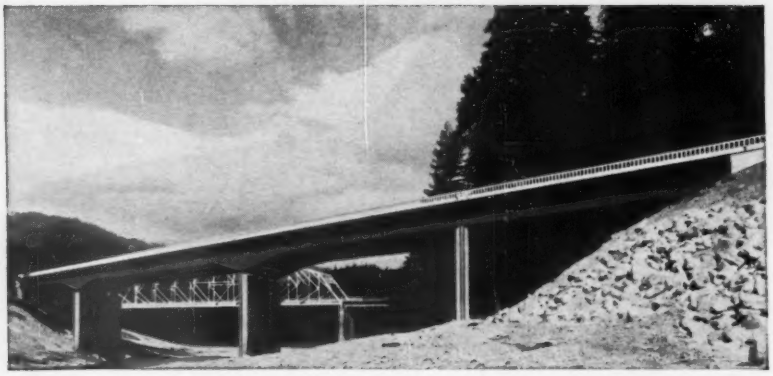




LET'S LOOK AT THE FACTS...

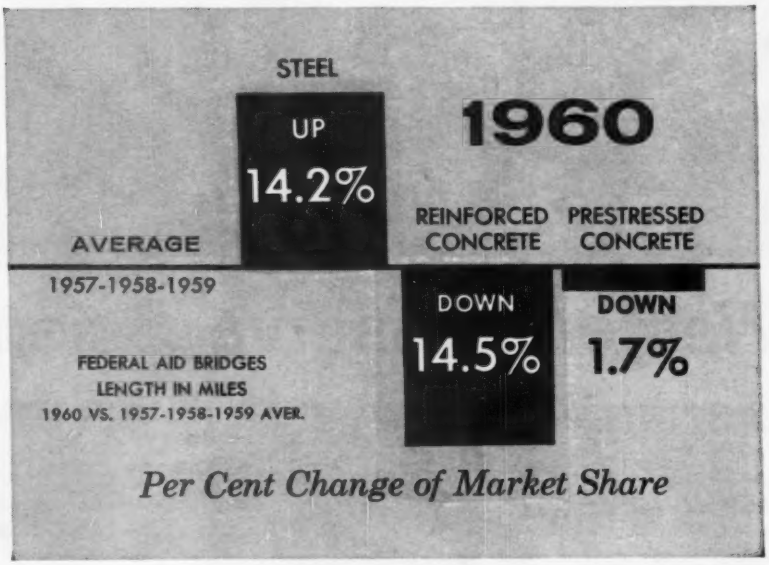
STEEL IS THE DOMINANT AND GROWING STRUCTURAL MATERIAL FOR BRIDGES!

Only *steel* increased its market share of federal aid highway bridges in 1960, compared to the three-year average of 1957-58-59, in terms of *total length of bridges authorized.*

Steel's percentage *increased* from 45.2 per cent of the total bridge length in 1957-58-59 to 51.6 per cent in 1960.

Reinforced concrete's percentage of total bridge length *decreased* from 42.9 per cent in 1957-58-59 to 36.7 per cent in 1960.

Prestressed concrete's percentage of total bridge length *decreased* from 11.9 per cent in 1957-58-59 to 11.7 per cent in 1960.



Good reasons for steel's increased use...

Steel is strong. Reliable. Versatile. Adaptable. And economical. Design your next bridge with steel; build it with steel. You'll find that steel makes sense. American Institute of Steel Construction, N. Y. 17.

Steel *STANDS for the future* AISC

Materials Prices

Monthly Market Quotations By ENR Field Reporters

See following ENR issues for OTHER PRICES:

- Wood Products, Glass, Explosives, Chemicals: Last, Sep. 21; Next, Oct. 19.
- Clay Products, Lime, Plaster, Paint, Roofing: Last, Sep. 28; Next, Oct. 26.
- Wage Rates, Building Board, Lath, Insulation: Last, Sep. 28; Next, Nov. 2.
- Cement Aggregate, Ready Mixed Concrete Asphalt: Last, Oct. 5; Next, Nov. 9.

Iron and Steel Products–F. O. B. Warehouse, Per 100 lbs., Base Price

Item	Unit	Atlanta W	Balti-more	Birming-ham	Boston	Chicago	Cin-cinnati	Cleve-land	Dallas	Denver	Detroit	Kansas City	Los Angeles##	Minne-apolis	New Orleans	New York	Phila-delphia	Pitts-burgh	St. Louis	San Fran-cisco	Seattle	Montreal	Toronto
Struct. shapes	Cwt	$7.52–8.15sV	$9.70	$9.00ty	$8.00–9 30KmV	$7.07–8.34vsV	$7.64–8.91styV	$7.46–8.73tysV	$7.51–9.18MsV	$8.24cK	$7.64–8.91MsV	$9.00sT	$8.70–10.45ktsV	$7.78–8.17ysV	.....	$7.85–9u13Vm	$7.35–8.40zsV	$7.07–8.34syV	$7.30–8.57stxyV	$9.40–11.25zsV	$8.60–10 80aDsV	$7.90–8.60CF/$8.90H 8.20–8.90AiF	
Reinf. bars, new steel	"	7.57	9.00T	6.81ayV	8.75t	6.30–6.45guV	8.21tf	6.70ct	8.50	9.35	7.37	8.21N	7.35frt	9.26T	$8.00gktz	8.60ty	7.93uy	7.35y	7.35ftxQ	8.35jS	9.00DM	7.00/7.50FGi	7.80
Reinf. bars, rail steel	"	.....	.....	6.81ayV	8.75t	6.30–6.45guV	.....	.....	8.50	.....	11.85	.....	.....	9.26T	.....	8.60y	9.30y	.....	7.35ftxyQ	.....	.....	7.00/7.50FGi	7.80
Expanded metal lath & std. diamond mesh, 3.4 lb	"	43.50	44.50	61.00pK	47.00K	52.00#U	44.50Kg	42.50KL	44.50u	53.00n	67.00 O	51.00	55.00S	42.50K	64.50K	50.00n	45.50#U	58.50frw	64.50wxK	53.00S	67.00#nD	65.700h	49.50qI
std. ribbed, 3.4 lb	"	48.00S	49.00	67.00pK	51.00K	63.00#U	48.50mnKg	46.50KL	49.00w	58.00n	74.00 O	55.00	64.00S	46.50K	61.00K	58.00no	50.00#U	64.50frw	65.00wxK	58.00S	73.50#nD	70.20h	44.85qI

Reinforcing Bar Extras, per cwt, N. Y.—* Quantity (applies to LCL shipments only): under 1,000#, +$1.80; 1000–1999#, +$1.50; 2000–4999#, +$1.20; 5000–9999#, +90¢; 10,000–19,999#, +60¢; 20,000–29,999#, +30¢; 30,000–39,999#, +10¢; 40,000# & up, none. * Size†: #2 +$2.50; #3 +$1.40; #4 +$1.00; #5 +70¢; #7, #8, #9, #10, #11 +50¢ * Bending: heavy, +90¢; light +$2.20 (except in New York City and surrounding metropolitan area where bending must be done on the job). * Engineering (details and placing from designs by others); over 500 tons, +45¢; 200–499 tons, +50¢ but not over $4500; 75–199 tons, +65¢ but not over $2000; 20–74 tons, +75¢ but not over $975; 5–19 tons, +85¢ but not over $300; under 5 tons, +$1.00 but not over $85. Min. charge $25. Design only: +60¢.

Structural Shape Extras, per cwt, Chicago, Cincinnati, Cleveland, Dallas, Detroit, New York, Philadelphia, St. Louis and Pittsburgh. Item; 10,000# and over, base, 5,000–9,999#, +10¢, 2,000–4,999#, +35¢, 1,000–1,999#, +85¢, 400–999#, +$1.75, 100–399#, +$1.75, under 100#, +$1.75. Order: 20,000# and over, base, 10,000–19,999, +25¢, 5,000–9,999, +65¢ 2,000–4,999, +$1.50, 1,000–1,999, +$2.50, 400–999, +$4.00, under 400, +$8.00. Item extras do not apply in Chicago, Cleveland, Cincinnati, Detroit and St. Louis. *f Delivered. ** Aver. of Canadian & American. *## add 4% sales tax. *a 2000–4999#. *b 10,000–19,999#, fob city. *c 20 tons or over. *d 10,000–29,999#. *e Intermediate struct'l. *f incl. delivery in free zone. *g CL. *h list price; dominion tax exempt; add provincial and municipal taxes. *j add provincial and municipal sales taxes. *j intermediate and hard grade. *k fob y. *l delivered; contractor to do unloading. *m copper alloy. *n LCL. *o asphalt coated. *p 500 sq yd. or more. *q 2.5 lb. *r less 2% disc. for cash. *s 10,000# item in 20,000# order. *t less ½% disc. 10 days. *u add 10¢ switch. *v incl 15¢ del. *w truck lots. *x add 2% sales tax. *y add 15¢ del. *z add 10¢ del. *A American made. *C Canadian made. *D ½% for cash. *E 30,000# or over. *F Federal tax exempt for bldgs. *G add 10¢ del. *H $8.85 without tariff charges. *I 3 lb $80.00. *J 4 lb $47.50. *K less 2% disc. 10 days. *L F.o.b. Youngstown plant. *M 5,000–9,999#. *N 2,000–19,999#. *O 100 sy lots. *Q 5 tons to CL. *R revised. *S less 2% disc. 10th. *T less ½% disc 10th of mo. *U less 2% disc. 10 days. *V varies according to type and size. *W add 3% sales tax

Iron and Steel Products–Base Mill Prices Carlot Quantities

Item	Unit	Birming-ham area	Chicago area	Pitts-burgh	Buffalo area	Cleve-land	Youngs-town area	Geneva	Los Angeles	Pueblo
Struct. Shapes	cwt	$5.50	$5.50	$5.50	$5.50	.....	.....	$5.50	$6.20	.....
Plate Carbon Steel	"	5.30	5.30	5.30	5.30	.....	.....	5.30	.....	.....
Reinf. Bars (billet)**	"	5.675	5.675	5.675	5.675	$5.675	$5.675	.....	6.375	.....
Rivets, ½" struct	"	12.25	12.25	12.25	12.25	12.25	.....	.....	.....	.....
Sheet Piling (base)	"	.....	6.50	6.50	6.50	6.50	.....	.....	6.50	.....
Steel Rails, standard	Ton	110.50	110.50	110.50	110.50	.....	.....	.....	.....	.....
light	"	130.00	130.00	130.00	130.00	.....	.....	.....	.....	.....
Track Supplies										
Angle bars	cwt	6.975	6.975	6.975	6.975	.....	.....	.....	.....	$6.975
Std. spikes	"	9.75	9.75	9.75	9.75	.....	9.75	.....	9.75	9.75
Tie plates	"	6.60	6.60	6.60	6.60	.....	.....	.....	6.875	6.60
Track bolts	"	.....	.....	14.75	14.75	14.75	.....	.....	.....	.....

WROUGHT STEEL PIPE (Full standard weight) Discount from list; see footnote

Mill	2½ & 3 in.,* Black %	2½ & 3 in.,* Galv. %	3½ to 6 in.,* Black %	3½ to 6 in.,* Galv. %
Lorain, Ohio	13.75	+3.50	+1.75f	+19.50f
Aliquippa, Pa.	13.75	+3.50	3.25a	+14.50a
Sparrows Pt., Md.	17.25	+List	.....	.....
Benwood, W. Va.	13.75	+3.50	.....	.....
Youngstown, O.	13.75	+3.50	3.25	+14.50a
Indiana Harbor, Ind.	12.75	+4.50	2.25ab	+15.50a
Sharon, Pa.	13.75	+2.50	3.25ab	+13.50ab
Wheatland, Pa.	13.75	+3.50	3.25a	+14.50a
Etna, Pa.	13.75	+3.50	.50de	.....
Fontana, Calif.	0.75	+16.50b	+9.75ab	+27.50ab

WROUGHT STEEL PIPE, butt or continuous weld: Deduct (+) or add (−) these "discounts" from or to the following carlot list prices to get mill prices. Price per ft. (based on approx. $200 per net ton): 2½ in., 58½¢; 3 in., 78½¢; 3½ in., 92¢; 4 in., $1.09; 5 in., $1.48; 6 in., $1.92. Add freight for destination price.

WROUGHT IRON PIPE, lap weld: List prices per ft. same as for wrought steel pipe, but add these "discounts" to get Pittsburgh mill price. 2½ to 3 in., black 106%; galv. 130%; 4 to 6 in., black 103%; galv. 133%. Add freight for destination price.

* Threaded and coupled: a 3½ to 4 in. b to 1, 5 and 6 in. c 6 in. d Seamless 5 in.

* Fairless Works, $5.825 Revised. These prices are nominal. Major reinforcing bar producers now quote prices on the basis of individual inquiries.

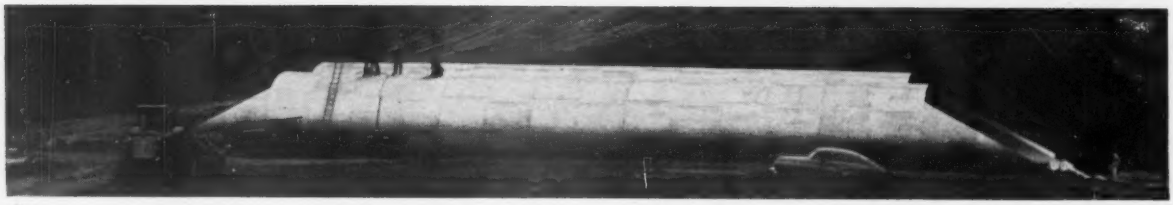
WELDED FABRIC REINFORCING, FOB Joliet, Ill., Donora, Pa., Monessen, Pa. mill, per 100 sq. ft.: 4 x 18 in., No. 5 & 10 wires....$7.04; 4 x 12 in., No. 8 & 12 wires....$2.62; 8 x 8 in., No. 6 & 6 wires....$4.17

Plumbing, Heating, Water, Sewer Pipe and Tubing

Item	Unit	Atlanta W	Balti-more	Birming-ham	Boston	Chicago	Cin-cinnati	Cleve-land	Dallas	Denver	Detroit	Kansas City	Los Angeles##	Minne-apolis	New Orleans	New York	Phila-delphia	Pitts-burgh	St. Louis	San Fran-cisco	Seattle	Montreal	Toronto
C. I. Pipe Price Index	a	130.6	140.2	125.8	143.2	140.0	135.6	141.8	137.9	145.1	142.1	138.6	148.6	145.0	132.4	138.6	137.9	142.9	135.7	148.6	149.0	.....	.....
Asbest. Cem. Pipe, 6"	lin. ft.	$1.51	$1.51	$1.51	$1.51	$1.51	$1.63	$1.63	$1.59	$1.59	$1.51	$1.51	$1.59	$1.51	$1.51	$1.51	$1.51	$1.51	$1.48	$1.59	$1.59	.....	.....
Asbest. Cem. Pipe, 12"	" "	2.36	2.19	2.26	2.19	2.19	2.19	2.19	2.26	2.36	2.19	2.26	2.19	2.26	2.26	2.19	2.19	2.19	2.26	2.19	2.19	.....	.....
Clay Sewer Pipe																							
8 in. ASTMC 13-55	ft.f	0.571rn	0.665	0.50r	0.84qrtL	0.93rm	0.595	0.66BCN	0.575fB	0.56nr	0.97nk	0.641r	0.86bl	1.05oB	0.566r	0.94	0.75	0.94K	0.63r	0.86fd	0.91bk	1.13u	0.76F
12 in. " "	"	1.09rn	1.20	0.95r	1.55qrtL	1.78rm	1.15	1.27tBC	1.09fB	1.00nr	1.86nk	1.148r	1.86blS	1.90oB	1.078r	1.76	1.44f	2.01K	1.26r	1.86fd	1.94kb	2.00u	1.43F
24 in. ASTMC 200-55T	"	4.67rn	3.05	4.14rw	6.39qrtM	7.52rm	4.95	8.47tBC	4.75fB	4.98r	7.48nk	6.354br	7.55blS	8.00oB	5.65r	12.89	9.49f#v	8.79K	5.20r	7.53fd	7.78k	7.00u	5.70F
36 in. " "	"	.....	12.71	13.50rw	.....	21.16rm	14.35	23.45tBC	10.53fbB	.....	19.95nk	.....	16.39blS	.....	.....	35.61	25 73f#v	24.15K	13.25rS	18.00fd	.....	13.50u	.....
Clay Drain Tile 6 in. V	M ft.	200.00rr	187.80	295.00rx	244.00r	220.00Br	177.50	179.40mBC	.....	460.00nr	212.00mk	327.00r	410.00lS	.....	240.50pr	240.81	225.00f	190.00	170.00r	360.00fJ	260.00ek	288.00	175.00F
8 in. V	M ft.	.....	289.20	430.00rx	348.60r	330.00Br	274.60	276.60mBC	.....	640.00nr	327.00mk	625.00r	590.00lS	.....	566.00	369.84	345.00f	295.00	300.00r	620.00fJ	135.00	545.00	290.00F
Concrete Sewer Pipe, 12"	ft.f	0.95mKr	1.01	1.75rS	1.56S	1.30	0.85rA	1.35	1.27BD	1.05m	1.40k	1.68r	1.30vE	2.19DFH	1.50fR	1.50fB	2.00fh	1.66DB	1.75i	105.00fQ	1.90ky	1.17D	1.27F
24 in.	ft.f	3.75mKr	2.75	2.75rS	3.60S	4.00	3.25rA	2.40P	2.95BD	3.50m	5.23k	4.20r	3.85fvE	6.31DFH	4.15il	3.60fB	4.30fh	3.93DB	4.05	3.30fQ	4.50ky	3.11jpD	5.19F
Copper Water Tubing																							
3/8", Type L	ft.	0.1480	.....	0.1650	0.1420	0.1420	0.1420	0.1420	.....	0.1680	0.1588	0.1320	0.1620	0.1620	0.1680	0.1491	0.1620	0.1441	0.1420	0.1480	0.1450	0.2089U	0.3344UV
1/2", Type L	"	0.1670	.....	0.1840	0.1630	0.1630	0.1630	0.1630	.....	0.1900	0.2210	0.1480	0.1840	0.1840	0.1900	0.1712	0.1840	0.1900	0.1630	0.1670	0.1640	0.2450U	0.3485UV

*† Extra quality. *f delivered. *## + 4% sales tax. *a PRICE INDEXES or CENTRIFUGAL CAST IRON PIPE (Include carload freight allowed to city). These also serve as the HISTORICAL RECORD of THE $ PER NET TON PRICE of CLASS B, B&S. PIT CAST IRON PIPE. F.O.B. Foundry Price Indexes Birmingham, Ala., 125.8; Burlington, N. J., 134.8. For explanation of index see ENR Sept. 29, 1955 page 139. *b Extra strength. *c 4-in., $130. *d SS361-A. *f 21 in. *g culvert pipe; reinf., ASTM C 75–56. *h reinf., ASTM C 75–54. *i reinf., ASTM C 76–55. *j centrispun. *k less 2% disc. for cash. *l fob plant. *m truck del. *n LCL del., fob truck. *p less 5% disc. 10th. *p freight allowed to destination in city. *u 35,000# minimum. *r less 2% disc. 10 days. *s 1 ft lengths. *u CSA A 60. *v standard strength. *w SS; add 20% for d.s. *x fob city. *y Reinforced. *z Upper value in range based on both truck lots and less than truck lots, fob city; lower value truck lots delivered. *A single strength. *B truckload. *C less 2% disc. 15th. *D ASTM 76–57. *E less 1% disc. 10 days. *F less 2% disc. 30 days. *G LCL. *H CL. *I fob origin, freight allowed. *J reinf. B14–15. *K Less 2% disc. 15 days. *L ASTM 13–57. *M ASTM 200–57. *N 2 ft lengths. Truckiots. *O add 2% Sales Tax. *P 18 in. *Q less 1% disc. 10th. *R revised. *S ASTMC 72, 12" 1.55, 24" 4.00. *T Second price transite pipe. *U Type K. *V including 11% sales tax, less 20% in lots under 6,000 ft. *W add 3% sales tax

Armco MULTI-PLATE Pipe Makes Economical Vehicular Underpass



View of construction site of twin underpass as erection crew bolts last plates of the MULTI-PLATE Structure.

Auto travels through completed MULTI-PLATE underpass while freight train, serving the coal mine, goes by overhead.

For strength, economy, durability

In constructing a railroad spur line to a new coal mine in Alabama, it was necessary to cross over a paved farm-to-market road. After careful consideration, owners of the mine decided on twin Armco MULTI-PLATE® Pipes for the two-way vehicular underpass.

An important factor was that corrugated metal MULTI-PLATE assured considerable savings over other types of bridging structures.

Each of the two lines of MULTI-PLATE Pipe was 17½ feet in nominal diameter, 168 feet long. Double railroad tracks are on a 32-foot wide roadbed, on top of the 25-foot fill.

Besides underpasses, industry uses MULTI-PLATE Structures for stream enclosures, access road bridges, and aggregate conveyor tunnels. Call your local Armco Sales Engineer for data on your specific needs, or write us for catalog. **Armco Drainage & Metal Products, Inc., subsidiary of Armco Steel Corporation, 7551 Curtis Street, Middletown, Ohio.**

ARMCO Drainage & Metal Products

Construction Reports

Bid Asked—Low Bidders—Contracts Awarded—

NEW ENGLAND

HEAVY CONSTRUCTION—LB & CA

▲ **MASSACHUSSETTS**—Commonwealth Mass., Dpt. P. Wks., 100 Nashua St., Boston, ROAD,
Bayer & Mingolla Constr. Co., Inc., P.O. Box 991, Worcester, Mass., CA **$3,143,191,** section relocated Rte. 2. U-348(14), Gardner. BA 8/15. CD 8/17/61, under LB.

▲ **CONNECTICUT**—State Hy. Comr., 170 Douglas St., Hartford, ROAD,
White Oak Excavators, Inc., 61 East Main St., Plainville Conn., CA **$4,435,829,** 12,469 lin. ft. grading, triple 20 x 20 ft. box culvert over Hockanum River approach from Founders Bridge, connections between Interstate Rte. 84 and East Hartford Hy., Proj. 42-127, 42-129, 42-130 and 42-131, East Hartford, BA 8/14/61. CD 8/16/61, under LB.

BUILDINGS—LB & CA

▲ **Lilly Constr. Co.,** 110 Western Ave., Allston, Mass., CA Est. **$2,500,000,** 175,000 sq. ft. SHOPPING CENTER, Derby St., HINGHAM, MASS. Plaza Realty Trust, c/o Wallace R. Marden, 230 Gardner St., Hingham, Mass. William Bradford Sprout, Jr., 235 Rockland St., Hingham, Mass., archt.

▲ **Granger Contg. Co., Inc.,** 306 Main St., Worcester, Mass., CA **$3,116,760,** est. $3,400,000, HIGH SCHOOL, Granite St., LEOMINSTER, MASS. City School Bldg. Comn., City Hall, Leominster, Mass. BA 9/14. CD 9/19/61, under LB.

MIDDLE ATLANTIC

HEAVY CONSTRUCTION—BA

▲ **N. Y., New York**—BA 10/23—Cunard Steamship Co. Ltd., lessee, 25 Broadway, Zone 4, Proj. D-87, 150x775 ft. finger PIER 94, SHED, BULKHEAD, W. 54 St., North River, for Dpt. Marine & Aviation, Battery Maritime Bldg., Zone 4, $5,500,000. Praeger-Kavanagh-Waterbury, 126 E. 38 St., New York 16, N. Y., archts.-engrs. CD 1/16/61.

▲ **New York**—BA 11/1—Triborough Bridge & Tunnel Auth., Admin. Bldg., Randall's Island, New York, Zone 35,
Narrows Bridge Contr. No. NB-11, Staten Island APPROACH and PLAZA incl. grading, drainage, concrete and steel structures and paving. Plans deposit $100. CD 1/20/55.

BUILDINGS—BA

▲ **N. J., Trenton**—BA 10/20—Ewing-Lawrence Sewerage Auth., 600 Whitehead Rd., SEWER LINES EXTENSION, six sections, 6 in. c.i. force mains; 8 in. gravity pipe and house connections, $2,000,000. Buck Seifert & Jost, 112 East 19th St., New York, N. Y., engrs. CD 8/8/61.

▲ **Pa., King of Prussia**—BA 10/23—Western Electric Co., Inc., 195 Broadway, New York, N. Y., DISTRIBUTION CENTER, Railroad Siding, $7,000,000. CD 9/8/61, under LB.

▲ **N. Y., Kingston**—BA 10/26—Bd. Educ., 403 Broadway, (1) Mary's Ave. ELEMENTARY SCHOOL, $1,-000,000; (2) Quarry St., JUNIOR HIGH SCHOOL. $2,600,000. Extended date. Separate and/or combined. Perkins & Will, 55 Church St., White Plains, archts. CD 9/28/61.

▲ **N. Y., West New Brighton**—BA 10/31—New York City Housing Auth., 299 Broadway, New York, Zone 7, (1) fdns. and general constr. (2) heating and ventilating (3) electric work, (4) plumbing work, RICHMOND TERRACE HOUSES, Proj. No. NY-5-39, Richmond Ter., Westervelt Ave., Cleveland St., Beechwood Ave., Crescent Ave. and Jersey St. with the exclusion of certain portions thereof, but incl. an addnl area west of Jersey St. Richmond Boro. $6,000,000. Plans deposit $75. CD 8/25/61.

▲ **N. Y., Albany**—BA 11/1—State Dpt. P. Wks., State Office Bldg., Albany, 10 story, 218x218 ft. OFFICE, 1 story, bsmnt., 144x192 ft. BLDG. NO. 8, Campus Site for Department Taxation & Finance. Unger & Unger & Francis X. Gina Assocs., 219 E. 44 St., New York, Zone 17, archts. Syska & Hennessey, Inc., 144 E. 39 St., New York, Zone 16, mech. engr. DiStasio & Van Buren, 4 Albany St., New York, struct. engrs. CD 1/25/60.

▲ **Pa., Indiana**—BA 11/6—Wallace Nordby, secy. Indiana Area Joint School Auth., 406 Savings & Trust Bldg., 645 Philadelphia St., general, plumbing, heating, and ventilating and electrical constr. work, for new Indiana Joint HIGH SCHOOL, Fifth St. Plans deposit $50. Heidrich, Kennedy & Risheberger Associates, 725 South Atherton St., State College, archts. CD 8/24/61.

HEAVY CONSTRUCTION—LB & CA

▲ **NEW YORK**—State Dpt. P. Wks., State Office Bldg., Albany, bids opened 10/5, ROADS,
N. Y.—Cold Springs Const. Co., 3 Jackson St., Akron, N. Y., LB **$1,188,680,** est. $1,526,000, (9 bidders), 9 in. c. conc. pavt. 5.36 mi. Genesee-Porterville, SH 1322. Rte. 17, FARC 61-144. Proj. F-421(9), Allegany Co.
N. Y.—Johnson, Drake & Piper, Inc., 86 Trinity Pl., New York, N. Y., LB **$11,150,616.50,** est. $12,222,-000, (7 bidders), c. conc. pavt. 2.55 mi., misc. work main line viad. 40 sps. comp., 1-beam 3,029 ft. 4 ramps 77 sps. comp. 1-beam 5,822 ft., 1 ramp rein.-con. slab, 22 sps. 440 ft., rein.-con. box sewer 365 ft. Van Wyck Expwy. Exten. Contr. 2 (57 Rd. to Rodman St.) Int. Rte. Conn. 514 Horace Harding Expwy. (Gr. Cent. Pkwy.) Interchange to Van Wyck Expwy. Interchange. Rte. 495 FAVWE 61-3. FIHHE 61-1. Proj. U-1085(21) I-495-1(49), Queens Co.
N. Y.—Tully & DiNapoli Inc. 127-50 Northern Blvd. Corona 68, N. Y., LB **$8,651,405.40,** est. $9,676,000, (6 bidders), b. conc. 4.19 mi., misc. work, HGS conc. arch 2 sps. 146 ft. HGS comp. 1-beam 2 sps. 158 ft. HGS comp. 1-beam and prestressed conc. 1323 ft. Int. Rte. Conn. 515 Whitestone Expwy. Contr. 1, (Flushing River Bridge to Whitestone Bridge. Rte. 678. FIWE 61-1. Proj. EI 678-1(64) Queens Co.
N. Y.—Tully & DeNapoli Inc. 127-50 Northern Blvd. Corona 68, N. Y., LB **$6,780,593.,** est. $7,781,000, (5 bidders), 8 in. c. conc. pavt. 0.87 mi., misc. work 0.12 mi. 3 HGS welded comp. beam 101 ft. 100 ft. 100 ft. Grand Central Pkwy. Sect. 3, Contr. 2, 150 St. to 172 St. FAGOP 61-3. Proj. U-629(2), Queens Co.
N. Y.—DeLillo Const. Co. Inc. 94 Marine St. Farmingdale, N. Y., LB **$4,281,781.65,** est. $4,917,000, (3 bidders) 8 in. c. conc. pavt. 3.08 mi., misc. work 0.23 mi., wid'n. 2 HGS conc. Rigid frame 1-63.5 ft. sp., 1-108.75 ft. sp., 2 HGS comp. 1-beam. 2 sp. 163 ft. total, 4 sp. 188.3 ft. Grand Central Pkwy. Sect. 3, Contr. 3A, 172 St. to Clearview Expy. FAGCP 61-4. Proj. U-629(21), Queens co.
N. Y.—L. G. DeFelice & Son Inc., Nettleton Ave., No. Haven, Conn., LB **$3,888,915.10,** est. $4,272,000, (7 bidders), 9 in. c. conc. pavt., misc. work 0.01 mi. 3 HGS 240 ft., 226 ft., 199 ft., 1 br. 137 ft. all comp. City of Ithaca, North East Arterial Hy. (Rosemary Lane-East City Line) Ithaca-Etna. Rte. 13 FAC 61-18. FASH 61-18. Proj. U-F-144(2), Tompkins Co. CD 9/6/61.

▲ **NEW YORK**—State Dpt. P. Wks., State Office Bldg., Albany, Bids opened 10/5, BRIDGES,

(Continued on page 76)

STOW

Portable Space Heater

SAFE, CLEAN, REGULATED, LOW-COST HEAT

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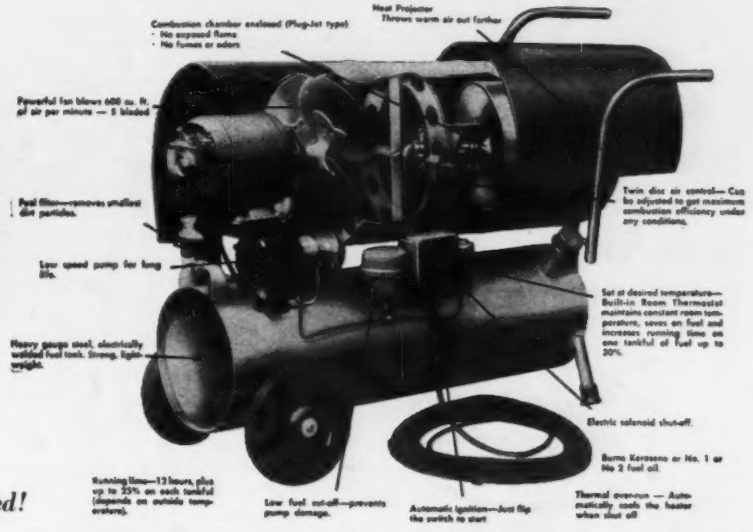
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Twin disc air control— Can be adjusted to get maximum combustion efficiency under any conditions.
Set at desired temperature— Built-in Room Thermostat maintains constant room temperature, saves on fuel and increases running time on one tankful of fuel up to 30%.
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Burns Kerosene or No. 1 or No 2 fuel oil.
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The rugged, lightweight Stow S-100 Space Heater blows 600 cu. ft. of clean, odorless heat per minute—warms vehicles, machinery or rooms at the flip of a switch! Built-in room thermostat maintains constant temperatures, saves fuel, increases tank running time by 30%. Its low-speed pump gives 12 hours running time, plus 25% per tank (depending on outside temperature) on low-cost kerosene, or No. 1 or 2 fuel oil. Enclosed combustion chamber eliminates exposed flames, fumes and odors—adjusts for maximum combustion efficiency under any conditions. Also features solenoid shut-off and low-fuel cut-off mechanisms. Available in models from 100,000 to one million BTU/HR. You get precision-engineered dependability—under any conditions, any temperature! For details, write today for a FREE Heater Catalog #6016.

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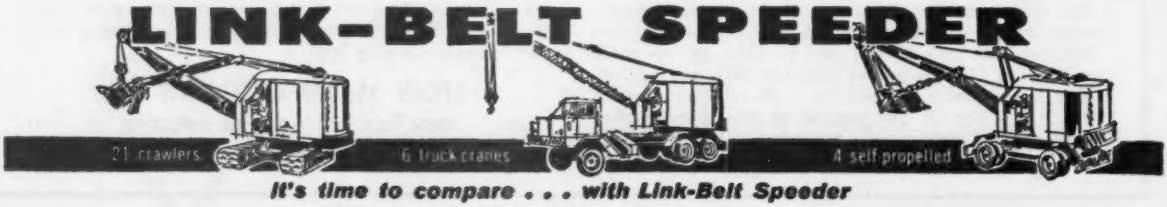

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CLOW CAST IRON PIPE

Continued from page 73)

Hendrickson Bros. Inc., 86 Trinity Pl., New York 6, N. Y., LB **$8,760,045.50**, est. $10,243,000, (4 bidders), track reloc. RR Sta. and misc. 3.32 mi., c. conc. 0.16 mi., 8 RR gr. seps. plate girder, 1 viaduct rein.-con., I-beam and girder elim. of grade crossings of L. I. RR with various streets in Hicksville (Main Line-Port Jefferson Div.) PSC 10324, Nassau Co. CD 9/6/61.

▲ **NEW YORK**—State P. Wks., State Office Bldg., Albany, Zone 1, BRIDGE,
Bates & Rogers Constr. Corp., 600 West Jackson Blvd., Chicago 6, Ill., CA **$3,435,000**, est. $5,515,000 railroad relocation misc. railroad yard work, 1 span railroad bridge, steel plate girder, 1 double box rein.-con. culvert, paving, grade crossing elimination (third phase) N. Y. C. R. R., Erie R. R., Lehigh Valley R. R., Niagara Junction R. R., Contr. PSC 6607, Niagara Co. BA 8/24, CD 8/25/61, under LB.

▲ **Walter Kidde Constructors, Inc.**, 19 Rector St., New York 16, N. Y., CA Est. **$6,000,000-$7,000,000**, 80 ft. tall, circular shaped TOWER of LIGHT with 24-1 m. candlepower light cannons, World's Fair Exhibit for Electric Industry, FLUSHING, N. Y. Power & Light Exhibit Inc., c/o Edison Electric Institute, 750 3 Ave., New York 17, N. Y. CD 6/13/61.

▲† **Hunkin-Conkey Constr. Co.**, 1740 E. 12th St., Cleveland, O., LB **$14,791,148**, (12 bidders), Allegheny Reservoir DAM, (Kinzua Dam) combination conc. gravity structures and rolled earth fill embankments, spillway, stilling basin, eight sluice conduits, prestressed conc. service bridge, rolled earth fill, tainter gates, acess roads and parking areas, Allegheny Reservoir, Allegheny River, Warren County, approx. 9 mi. above Warren, ENG-36-058-62-3, PENNSYLVANIA. U. S. Eng., 925 New Federal Bldg., Pittsburgh 19, Pa. BA 10/4. CD 8/29.

▲ **PENNSYLVANIA**—State Hy. Dpt., 506 North Office Bldg., Harrisburg, Bids opened Sept. 29, ROAD,
Dinardo, Inc., 331 South Bouquet St., Pittsburgh 13, Pa., LB **$2,677,249**, divided hy. conc. base with bit. surf., 28 ft. and variable in width on each side of median; 0.34 mi., west bound Bedford Ave. Bridge over L. R. 1026 and ramps A. C. and K; Webster Ave. Bridge over L. R. 1026, and ramps E. D. and F; ramp, G, bridge over L. R. 1026; south bound bridge over Ramp D, Ramp F bridge over Ramp D, Leg. Rte. 1026 (Crosstown Expressway), Pittsburgh, Allegheny Co. CD 8/31/61.

▲ **PENNSYLVANIA**—State Hy. Dpt., 506 North Office Bldg., Harrisburg. Bids opened Sept. 29, ROADS,
Pa.—**S. J. Groves & Sons**, Simpson Ferry Rd., and Rte. 15, Camp Hill, Pa., LB **$3,650,018**, (6 bidders), 34,740 ft. separate hy. consisting, c. conc. pvt., 24 ft. wide, seven pairs of bridges, L.R. 799(3), Cumberland Co. CD 8/31/61.
Lycoming Constr. Co., Williamsport, Pa., LB **$3,017,750**, (12 bidders), 21,010 ft. c. conc. pavement 24 ft. wide, and five bridges, L.R. 1009(82) Sec. Keystone Shortway Interstate, Montour Co.; LB **$2,664,933**, (12 bidders), 22,802 ft. constr. of separate hy. consisting of c. conc. pvt. 24 ft. wide, 5 bridges L.R. 1009(81) Sec. Keystone Shortway, Interstate, Northumberland and Montour Counties;

BUILDINGS—LB & CA

▲ **Thomas D. McCloskey & E. K. McCloskey**, 1620 W. Thompson St., Phila., Pa., LB, (7 bidders), lease-build (Govt. Maintenance), POST OFFICE, BUFFALO, N. Y. Regional Real Estate Mgr., Rm. 5012, Main Post Office, New York 1, N. Y. Total est. **$8,500,000**. BA 9/22, CD 9/12/61;
Overlook Properties, Inc., 350 5 Ave., New York, N. Y., LB lease-build (lessor assumes maintenance), POST OFFICE (Buffalo, N. Y.).

▲ **Allis-Chalmers Mfg. Co.**, 1126 S. 70 St., Milwaukee, Wis., CA 1,000,000 kw. STEAM GENERATOR for East River Generating Station Extension, Franklin D. Roosevelt Dr., E. 15 to E. 18 Sts., NEW YORK, N. Y. Consolidated Edison Co., 4 Irving P., New York 3, N. Y. CD 9/26/61.

▲ **Henry Kadel**, Kadel Dr., Little Falls, N. J., Owner Builds, **$3,000,000**, 140 HOUSES, Windmere Ave., HOPATCONG, N. J. Leonard Feinen, 320 Lincoln Ave., Hasbrouck Heights, N. J., archt.

▲ **Sica Skiffs, Inc.**, Rte. 37, Toms River, N. J., Owner Builds, **$4,000,000**, MARINE CITY, 90 acres at Dillon Creek, incl. marina, boatel, restaurant, boat factory and showroom, marine supply store, ISLAND HEIGHTS, N. J. Stephen M. Olko, 50 East 42nd St., New York 17, N. Y. engr.

▲ **Allstate Constr. Corp.**, Rte. 22, North Plainfield, N. J., CA Est. $4,000,000, 237,000 sq. ft. DEPARTMENT STORE, Eagle Rock and Prospect Aves., WEST ORANGE, N. J. Philip J. Levin & Affiliates, Rte. 22, North Plainfield, N. J. E. J. Korvette, Inc., 12 East 46th St., New York 17, N. Y., lessee.

▲ **Kober Constr. Co.**, 9 Union Ave., Bala Cynwyd, Pa., CA Over **$2,500,000**, 300 units, APARTMENTS, School House Lane, PHILA., PA. David Peace, 69th and Market Sts., Phila., Pa. Geddes, Brecher & Qualls, 258 S. Van Pelt St., Phila., Pa., archts. David Bloom, 225 S 15th St., Phila., Pa., engr. CD 1/20/61.

▲ **Samuel N. Zarpas, Construction Div. Missile Sites, Inc.**, P.O. Box 4457, Pittsburgh 5, Pa., LB **$2,419,000**, general contract. Hamilton-Larimer HOUSING PROJ. PA-1-11, East Liberty, PITTSBURGH, PA. Pittsburgh Housing Auth., 200 Ross St., Pittsburgh 19, Pa. BA 9/21/61. CD 9/19/61.
Ted Walsh & Son, 2040 Brownsville Rd. Pittsburgh 10 Pa., LB **$425,990**, plumbing for Hamilton-Larimer HOUSING PROJ. (Pittsburgh, Pa.).

▲ **Rupert Constr. Co.**, 3400 Lancaster Ave., Wilmington, Del., LB **$3,142,000**, (3 bidders), Christiana HIGH SCHOOL, Salem Church and Chopin Rd., NEWARK, DEL. Newark Special School Dist., Newark, Del. BA 9/27/61. CD 9/13/61.

SOUTH

HEAVY CONSTRUCTION—LB & CA

▲ **Markwell & Harte**, P.O. Box 6225, East Memphis Station, Memphis, Tenn., CA **$2,550,195**, Contract A, SEWAGE TREATMENT PLANT, IMPRVS. and LINES, Intrenchment Creek Water Pollution Control Plant, ATLANTA, GA. City, City Hall, Atlanta, Ga. BA 9/7/61. CD 9/12/61, under LB.

▲ **LOUISIANA**—State Dpt. Hys., Rm. 426, Headquarters Admin. Bldg., Baton Rouge, Bids opened 9/27, ROAD,
Boh Brothers Constr. Co., Inc., 2400 Cypress, New Orleans, La., LB **$5,498,757**, c. conc. pavt. 0.936 mi., elevated expressway structure Baton Rouge Interstate Rte. (Government St.-Washington St.), Rtes. I-410 and I-10. SP Nos. 450-33-34 and 450-10-05 FAR Nos. I-410-3 (13) 163 and I-10-3(14)156, East Baton Rouge Parish. CD 9/12/61.

▲ **KENTUCKY**—Commonwealth Ky., Dpt. Hys., Frankfort, Bids opened 9/29, ROADS,
Ky.—**Ralph Myers Constr. Corp.**, Box 230, Salem, Ind., LB **$4,656,384**, (7 bidders), grade, surf. service roads 4.009 mi. Lexington-Catlettsburg, I 64-8(8) 184, Boyd Co.; LB **$2,880,481**, (9 bidders), grade, surf. service roads 2.883 mi. Lexington-Catlettsburg, I-64-8(9)187, Boyd Co.; LB **$2,757,986**, (9 bidders), grade, surf. service roads, 5.456 mi. Covington-Lexington, I 75-6 (10)141, Grant Co.;
Ky.—**Henderson Hite Constr. Co.**, Box 54, Bardstown, Ky., LB **$267,567**, (3 bidders), traffic bound surf. 4.983 mi. Linwood-Ky. 210, S 693(1), Green Co.;
Ky.—**R. C. Durr**, Rte. 1, Walton, Ky., LB **$269,660**, b. conc. Class I, 0.814 mi. Stanford By-Pass, F 244 (7), Lincoln Co. CD 9/13/61.

▲ **TENNESSEE**—State Hy. Dpt., Nashville, Bids opened Sept. 29, BRIDGES,
Tenn.—**Ruth Constr. Co.**, New Market, Tenn., LB **$2,812,536**, grading, paving with crushed stone, bit. materials (plant mix) constr. of two sets of twin bridges, Sect. of Interstate Rte. No. 75, 3.15 mi., Proj. No. I-75-3(5)110, Campbell Co.;
Tenn.—**T. E. Gillespie Constr. Co.**, Lebanon, Tenn., LB **$700,927**, grading, constr. of three bridges, 4.147 mi., Proj. No. I-65-2(13)65, Williamson Co.;
Tenn.—**Morgan Constr. Co.**, Clarksville, Tenn., LB **$733,962**, grading, constr. 1 set of twin conc. deck bridges on sect. of Interstate Rte. No. 40, 3.949 mi., Proj. No. I-40-3(22)166, Dickson Co. CD 9/15/61.

BUILDINGS—LB & CA

▲ **Thorington Constr. Co., Inc.**, 2106 North Hamilton St., Richmond, Va., CA **$3,271,700**, W. T. Woodson HIGH SCHOOL, FAIRFAX, VA. Fairfax County Bd. Educ., Fairfax, Va. BA 9/21/61. CD 9/25/61, under LB.

▲ **Mid-South Constructors, Inc.**, 79 Commerce St., Montgomery, Ala., CA **$2,610,000**, 3 building PHYSICAL SCIENCE CENTER, AUBURN, ALA. Bd. Trustees, Auburn University, Auburn, Ala. BA 8/29/61. CA 10/2/61. CD 9/6/61, under LB.

▲ **Frontier, Inc.**, c/o Citizens Realty Co., Moore Bldg., Montgomery, Ala., Owner Builds, **$4,000,000**, 1400 brick over concrete slabs HOMES for ELDERLY, PRATTVILLE, ALA.

▲ **The Girdler Corp.**, 1721 S. 7 St., Louisville, Ky., CA ammonia compression and ammonia synthesis PLANT UNITS, PASCAGOULA, MISS. Coastal Chemical Corp., subsidiary Mississippi Chemical Co., P.O. Box 563, Yazoo City, Miss. Total est. **$4,500,000**. CD 7/20/61;
J. F. Pritchard Co., 4625 Roanoke Pkwy., Kansas City, Mo., CA GAS-REFORMING and GAS-PURIFICATION Plant Units, (Pascagoula, Miss.).

▲ **Kaiser Engineers Div., Henry J. Kaiser Co.**, Kaiser Center, 300 Lakeside Dr., Oakland 12, Calif., CA Est. **$6,000,000**, HYDROGEN FLUORIDE and FLUROCARBONS PLANT, Gramercy Works, BATON ROUGE, LA. Kaiser Aluminum & Chemical Corp., Kaiser Center, 300 Lakeside Dr., Oakland 12, Calif. CD 12/6/55.

▲ **S. S. Jacobs Co.**, Independent Life Bldg., Jacksonville, Fla., CA **$3,500,000**, 285,000 sq. ft. Eastgate SHOPPING CENTER, on Brainerd Rd., with 2,000 car parking lot, CHATTANOOGA, TENN. Independent Theaters, Inc., 509 Cherry St., Chattanooga, Tenn. Toombs, Amisano & Wells, 70 Fairlie, NW, Atlanta, Ga., archts.

MIDDLE WEST

BUILDINGS—BA

▲ **Ill., Carbondale**—BA 10/17—Southern Illinois University, Carbondale, PHYSICAL EDUCATION-MILITARY BLDG. $3,500,000. CD 9/9/58.

▲ **O., Cleveland** — BA 11/9 — Cleveland Metropolitan Housing Auth., 1332 W. 28th St., Zone 13, 782 unit low-cost Riverview Terrace HOUSING, between W. 25th St. and Cuyahoga River. $9,000,000. Plans deposit $100. Hayes & Ruth, 1720 Euclid Ave., Zone 15, archts. Charles L. Knight, 13212 Shaker Sq.,

Zone 20, site engr. Barber, McGee & Hoffman, 1900 Euclid Ave., Zone 15, structural engrs. Byers, Urban, Klug & Pittenger, 1740 E. 12th St., Cleveland, mechanical and electrical engrs. Alfred T. Yanda, 4500 Euclid Ave., Zone 3, civil engr. CD 7/31/58.

▲ **Ill., Centralia**—BA 11/7—State Dpt. Mental Health, State Office Bldg., Springfield, general work, plumbing, heating, high temp. water system, electric, kitchen, etc. for STATE INSTITUTION OF MENTALLY RETARDED, $11,500,000. CD 9/5/61.

BUILDINGS—SLC

▲ **Ill., Chicago**—Chicago High Rise Corp., 720 N. Michigan Ave., soon lets contract, APARTMENT, OFFICE, 535 N. Michigan Ave. $8,000,000. CD 3/23/61.

HEAVY CONSTRUCTION—LB & CA

▲ **ILLINOIS**—State Dpt. P. Wks. & Bldgs., Div. Hys., Centennial Bldgs., Springfield, ROADS,

Ill.—**Eric Bolander Constr. Co.**, Winchester Rd., Libertyville, Ill., CA **$1,172,488,** paving 0.97 mi. FA 178 and interchange with U. S. 6 north of Peru, LaSalle Co.;

Ill.—**Hoeffken Bros., Inc.**, 222 W. B St., Belleville, Ill., CA **$559,448,** base course, widening slab bridge, 5.27 mi. on relocated U. S. 51 south of Centralia, Washington, Jefferson and Marion Counties;

Ill.—**Charles G. Ind,** Point Ave., Rockford, Ill., CA **$2,111,411,** reconstr. Ottawa Test Rd. as part of Interstate 80, LaSalle Co.;

Ill.—**O'Connor Constr. Co.**, Reisch Bldg., Springfield, Ill., CA **$3,325,000,** paving 6.83 mi. Interstate 57 grade separations, frontage roads, near Effingham, Effingham Co. Grand total $7,168,347. BA 9/19/61, CA 10/3/61. CD 9/22/61, under LB.

▲ **MICHIGAN**—State Ry. Dpt., 732 Mason Bldg., Lansing, Zone 26, Bids opened 9/27, ROADS,

Mich.—**Carl Goodwin & Sons, Inc.**, 500 Delano, Allegan, Mich., LB **$2,124,417,** 11.1 mi. Kalamazoo to Grand Rapids Freeway; 6.1 mi. freeway from end of exist. freeway at M-89 in Plainwell, Allegan Co. south to "E" Ave. west of Kalamazoo incl. interchange at "D" Ave. about 4.5 mi. south of Plainwell, grade separation at 102 St., 1 mi. south of Plainwell and grade separation at "B" Ave. about 2.5 mi. south of Plainwell, Kalamazoo to Grand Rapids Freeway; LB **$2,615,093,** 5 mi. freeway from "B" south to M-43 incl. interchange at M-43 about 4 mi. west of Kalamazoo, grade separation at Ravine Rd. about 5.5 mi. northwest of Kalamazoo and grade separation at "H" Ave. about 4 mi. northwest of Kalamazoo incl. modernization of 1.2 mi. M-43 between 10 and 12 Sts., Kalamazoo to Grand Rapids Freeway;

Mich.—**Charles J. Rogers,** 14836 Grand River, Detroit 27, Mich. and **Cooke Contracting, Jutton-Kelly,** 13240 Alber Ave., Dearborn, Mich., LB **$1,610,132,** nearly ½ mi. Chrysler Freeway from Warren Ave. north to Hendrie Ave. incl. four bridges,, paving of service roads, storm water pumping station and alterations to utilities, Wayne Co. CD 9/18/61.

BUILDINGS—LB & CA

▲ **Knowlton Constr. Co.**, 1133 W. Columbus St., Bellefontaine, O., LB **$3,168,822,** 4-unit DORMITORY, DINING ROOM, Kent State University, KENT, O. DPT. P. Wks., State Depts. Bldg., Columbus, O. BA 9/27/61, CD 8/25/61;
Steinle-Wolfe, Inc., 128 N. Jefferson St., Fremont, O., LB **$953,253,** 5-unit, 2 story MARRIED STUDENT DORMITORY, Kent State University (Kent, O.).

▲ **Columbia Estates, Inc.**, 25777 Yeoman Dr., North Olmsted, O., Owner Builds, **$2,500,000,** $1,250,000 first year (2 year program), 120 HOMES, Palm Drive Estates, NORTH OLMSTED, O.

▲ **Huber, Hunt & Nichols, Inc.**, 2450 S. Tibbs Ave., Indianapolis, Ind., CA, 7 story OFFICE, 120 ft. bridge to connect with auditorium, 2 story ENGINEERING BLDG., ADMINISTRATION CENTER, MOLINE, ILL. Deere & Co., 1325 3rd Ave., Moline, Ill. Eero Sarrinen & Assocs., 1300 Woodward St., Birmingham, Mich., archts. CD 4/29/60.

▲ **Ragnar Benson, Inc.**, 4744 W. Rice St., Chicago, Ill., CA **$5,750,000,** FOLDING CARTON PLANT, WHEATON, ILL. Container Corp., 38 S. Dearborn St., Chicago 3, Ill. CD 10/3/61.

MISSISSIPPI TO ROCKIES

BUILDINGS—BA

▲ **Okla., Oklahoma City**—BA 11/1—Kerr-McGee Oil Co., Kerr-McGee Bldg., Zone 2, 18 story OFFICE, 132 NW 2nd St. $3,000,000. Plans deposit $50. Extended date. Coston Frankfurt & Chore, 323 D. Madison St., Zone 5, archts. CD 9/15/61.

▲ **Okla., Tulsa**—BA 11/7—City, City Hall, CIVIC ASSEMBLY CENTER. $7,000,000. Edward Stone, 38 E. 65th St., New York, N. Y., archt. CD 8/6/59.

BUILDINGS—SLC

▲ **Mo., Kansas City**—Southwestern Bell Telephone Co., 1010 Pine St., St. Louis, Mo., soon lets contract 8 story, 123,672 sq. ft., masonry, steel, concrete block OFFICE. $4,000,000. Neville, Sharp & Simon, 25 E. 12 St., Kansas City, Mo., archts. CD 9/5/61, under LB.

HEAVY CONSTRUCTION—LB & CA

▲ **MINNESOTA**—State Hy. Dpt., Hy. Bldg., St. Paul, ROADS,

Minn.—**Brown & Leguil,** Rte. 1, Mankato, Minn. and **Hoover Constr. Co.**, Hoover Rd., Virginia, Minn., CA

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With accurate sub-soil information, you avoid costly trouble later on. And, what better way to get this information than with a portable, easy to use Acker Soil Sampling Kit. For here is a versatile collection of twelve soil sampling tools packed in a handy steel kit that can be carried in any car.

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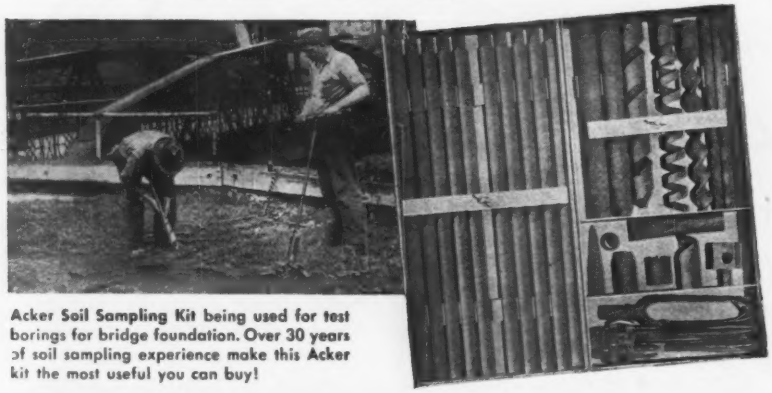

Acker Soil Sampling Kit being used for test borings for bridge foundation. Over 30 years of soil sampling experience make this Acker kit the most useful you can buy!

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$3,841,231, grading and bridges 6.7 mi. Hennepin Co.;

Minn.—**E. W. Coons Co.,** Box 239, Hibbing, Minn., CA **$753,838,** concrete pavt. 4.5 mi. St. Louis Co.;

Minn.—**Minnesota Valley Improvement Co., Granite Falls, Minn. and Berghuis Constr. Co.,** Prinsburg, Minn., CA **$804,454,** grading, gravel base and road-mixed bit. base 16.8 mi. Traverse Co.;

Minn.—**W. Collins & Son, Inc.,** 528 Gate City Bldg., Fargo, N. D., CA **$588,811** grading, gravel base and plant mixed bit. surf. 13.9 mi. Marshall Co.;

Minn.—**Megarry Bros.,** 437 33 Ave. North, St. Cloud, Minn., CA **$591,636** grading, gravel base, road mixed bit. base and Bridge No. 9462, Benton and Morrison Counties;

Minn.—**Fischer Constr. Co.,** Farmington, Minn., CA **$628,752** gravel, gravel base, plant mixed bit. surf. and bridge No. 19001, Dakota Co.;

Min.—**Ryan, Inc.,** Janesville, Wis., CA **$1,485,490** grading, gravel base, plant mixed bit. surf. and bridges Nos. 27021 and 27022, Hennepin Co.;

Minn.—**Sheehy Bridge Constr. Co.,** 160 West Larpenteur Ave., St. Paul, Minn., CA **$552,256** grading and bridges Nos. 9612, 9613 and 9614, Hennepin Co. Grand total $9,246,468. BA 9/15. CD 9/27/61, under LB.

▲ **SOUTH DAKOTA**—State Hy. Dpt., Pierre, Bids opened Oct. 3, ROADS,

S. D.—**Western Contg. Corp.,** 400 Benson Bldg., Sioux City 16, Iowa, LB **$3,021,360,** (7 bidders), 10.012 mi. conc. paving on I 29 from 2 mi. south of Beresford North, I 29-2(7)47 & I 29-1(11)45, Lincoln and Union Counties; LB **$2,813,416,** 7.965 mi. conc. pvt. on I 29 from 2 mi. south of Beresford South, I 29-(14)37, Union Co.;

S. D.—**W. H. Noel Co.,** Jamestown, N. D., LB **$445,974,** (9 bidders), 8.142 mi. shoulder widening and bit. surf. US 81 from North Co. Line to Salem, F 051-3, McCook Co. CD 8/23/61.

BUILDINGS—LB & CA

▲ **H. B. Deal Constr. Co.,** 5517 Manchester Ave., St. Louis 10, Mo., CA Est. **$2,750,000,** 11 story, 45x101 ft MOTOR-HOTEL, two 5 story, 30x101 ft. each WINGS, PARKING GARAGE, 4483 Lindell Blvd., ST. LOUIS, MO. Harold W. and Melvin Dubinsky, 721 Chestnut St., St. Louis 1, Mo., and Paul Kapelow, 129 S. Claiborne St., New Orleans, La. CD 6/20/61, under CA.

▲ **Fluor Corp., Ltd.,** 2500 S. Atlantic Blvd., Los Angeles 22, Calif., CA, design and construct BENEZENE EXTRACTION PLANT, incl. 2,300 bbls. per day pyrolysis gasoline hydrogenation (Hydrotreater) unit, 12,500 bbls. per day benezene recovery (Udex) unit, BEAUMONT, TEX. Mobil Chemical Co., Beaumont, Tex. CD 9/21/60.

▲ **W. S. B. Builders, Inc.,** Weatherford Ave., Fort Worth, Tex., Owner Builds, **$7,775,000,** 500 one story, brick, elderly people HOUSING, Jenkins Heights, FORT WORTH, TEX. Carter & Burgess, 1100 Macon St., Fort Worth, Tex., engrs. CD 9/21/61.

▲ **Fluor Corp.,** 2500 Atlantic St., Los Angeles, Calif., CA Est. **$9,000,000,** design and constr. open-air PETROCHEMICAL PLANT, 1 story, 8,000 ft. ADMINISTRATION BLDG., FREEPORT, TEX. Nalco Chemical Co., 6216 W. 66 Pl., Chicago 38, Ill. CD 6/1/61.

▲ **Tellepsen Constr. Co.,** 1710 Telephone Rd., Houston, Tex., CA **$3,750,000,** SHOPPING CENTER, (1st phase), Southmore and Tatar Sts., PASADENA, TEX. Howard T. Tellepsen & Associates, 1710 Telephone Rd., Houston, Tex. Lloyd, Morgan & Jones, 4605 Montrose Blvd., Houston, Tex., archts. CD 10/11/55, under Gulf Coast Land & Development Co., as owner.

▲ **W. B. Uhlhorn,** P.O. Box 2028, Harlingen, Tex., LB **$2,967,777,** est. $1,150,000, (6 bidders), 5 story, 165,000 sq. ft., conc. frame, brick, Wesley Manor RETIREMENT HOME, WESLACO, TEX. Southwest Texas Methodist Conference, McAllen Dist. T. Weiss, Henson Bldg., Weslaco, Tex. BA 9/15/61. CD 8/16/61.

▲ **Mead & Mount Constr. Co.,** Denver Club Bldg., Denver, Colo., LB **$5,535,000,** HOSPTAL ADDN., DENVER, COLO. St. Joseph's Hospital, 1818 Humboldt, Denver, Colo. BA 9/29/61. CD 8/31/61.

▲† **George A. Rutherford, Inc.,** P. O. Box 1778, Albuquerque, N. M., CA **$2,988,988,** Crownpoint SCHOOL, CROWNPOINT, N. M. Bureau Indian Affairs, Albuquerque, N. M. BA 9/6/61. CD 8/1/61.

FAR WEST

HEAVY CONSTRUCTION—BA

▲† **Nev., Mercury**—BA 11/7—Atomic Energy Comn., 1235 Main St., Las Vegas, AIR STORAGE SYSTEM and ADDNS. to EXPERIMENTAL FACILITIES at Pluto Test Area, Tory II C reactor, Nevada Test Site. $6,000,000. Norman Engineering Co., 5899 Venice St., Los Angeles, Calif., archt.-engr. CD 3/8/60.

BUILDINGS—BA

▲ **Calif., Santa Barbara**—BA 10/31—University of California at Santa Barbara, Goleta, RESIDENCE HALL UNIT 4 and DINNING COMMONS NO. 2 ADDN., University of California, Goleta. $3,000,000. Plans deposit $100. Chas. Luckman Assocs., 9220 Sunset Blvd., Los Angeles, archts.

HEAVY CONSTRUCTION—LB & CA

▲ **CALIFORNIA**—State Div. Hys., 120 S. Spring St., Los Angeles, Bids opened 9/28, ROAD, **Fredrickson & Watson Constr. Co., Kirst Constr. Co.** and **Jack L. Adams Constr. Co.,** 873 81 Ave., Oak-

(Continued on page 80)

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(Continued from page 78)

land, Calif., LB **$6,496,507,** (10 bidders), constr. 15 mi. four lane freeway and 1 mi. four lane hy. on Antelope Valley Freeway (US Hy. 6) between Soledad Canyon Rd. and Red Rover Mine Rd., Los Angeles Co. CD 8/16/61.

▲ **CALIFORNIA**—State Div. Hys., 1120 N St., Sacramento, Bids opened 9/27, ROAD,

Gordon H. Ball, Gordon H. Ball, Inc. and Talbot D. Bailey, Inc., 300 Camille Ave., Danville, Calif., LB **$4,522,222,** (3 bidders), 2.1 mi. four lane freeway US Hy. 101, Santa Barbara Co. CD 8/24/61.

▲ **Shanley Constr. Co. & W. J. Nicholson,** 503 Market St., San Francisco 5, Calif., CA **$2,751,747** TRUNK LINES and SEWAGE FACILITIES, Northeast Sacramento County Sanitation Dist., Carmichael, Citrus Heights Area, north of SACRAMENTO, CALIF. Bd. Supervs. Sacramento Co., County Admin. Bldg., 827 7 St., Sacramento, Calif. BA 9/13, CA 9/27. CD 9/15/61, under LB.

BUILDINGS—LB & CA

▲ **The Lusk Corp.,** 6910 E. Broadway, Tucson, Ariz., Owner Builds, **$18,000,000,** 2,000 unit APARTMENT DEVELOPMENT, on 200 acres at SE corner Hayden and Roosevelt, SCOTTSDALE, ARIZ.

▲ **Cawdrey & Vemo,** 3601 Fremont Ave., Seattle 3, Wash., CA Est. **$3,000,000,** 4 story, RETIREMENT HOME, ZENITH, WASH. Washington Baptist Convention Retirement Home, Inc., 321 1st. Ave. W., Seattle, Wash. John Graham & Co., 1426 5th Ave., Seattle 1, Wash., archts. CD 7/9/59.

▲ **Crown Constr. Co.,** 5059 W. Pico Blvd., Los Angeles, Calif., CA **$3,954,238,** est. **$4,097,000,** 192,-000 sq. ft. RESIDENCE HALL No. 3, LOS ANGELES, CALIF. University of California at Los Angeles, 405 Hilgard Ave., Los Angeles, Calif. BA 9/7, CA 9/23. CD 9/11/61, under LB.

▲ **S. Patti Constr. Co.,** 1340 Admiral Blvd., Kansas City, Mo., CA **$4,398,000,** est. $4,500,000, 11 story SOCIAL SCIENCE BLDG., Unit 1, University of California, LOS ANGELES, CALIF. University of California at Los Angeles, 405 Hilgard Ave., Los Angeles, Calif. BA 9/27. CD 9/29/61.

CANADA

BUILDINGS—BA

▲ **Ont., Cooksville**—BA 10/24—South Peel Hospital, Upper Middle Rd., 5 and 6th floor HOSPITAL ADDN. $5,696,000. Plans deposit $250. Chester C. Woods, 2842 Bloor St. W., Toronto, archt. Ralph C. Manning & Assocs., 745 Mt. Pleasant Rd., Toronto, engrs. Donald A. McCuaig, 19 Dundas Hy. W., Toronto, assoc. archt. CD 12/8/60.

AMERICANS ABROAD

BUILDINGS—LB & CA

▲ **Koppers Export Gmbll., Essen, Germany,** subsidiary Koppers Co., Inc., Koppers Bldg., Pittsburgh, Pa., U. S. A., CA Est. **$8,000,000,** IRON ORE SINTERING PLANT, Rourkela Steel Proj., Orissa State, ROURKELA, INDIA. Hindustan Steel Ltd., Rourkela, India. CD 1/11/60.

LATIN AMERICA

HEAVY CONSTRUCTION—LB & CA

▲ **DOMINICAN REPUBLIC**—Dpt. P. Wks., Govt. Dominican Repupblic, Ciudad Trujillo, ROAD,

Elmhurst Cont. Co., Div. Hagan Industries, Inc., 53-09 97 Pl., Corona, N. Y., U.S.A., CA **$6,000,000,** Duarte Hy. north from Ciudad Trujillo.

BUILDINGS—LB & CA

▲ **Montreal Montagem E Representaco Industrial S.A.,** Sao Paulo, Rua Braulio Gomez 36, Sao Paulo, Brazil, CA Est. **$15,000,000,** ELECTROLYTIC CAUSTIC CHLORINE PLANT, CUBATAO, BRAZIL. Diamond International Corp., Union Commerce Bldg., Cleveland 14, O., U.S.A. Oronzio DeNora Impianti Elettrochimici, Milano, Italy, engr. CD 8/30/61.

▲ **Fluor Corp., Ltd.,** 2500 S. Atlantic Blvd., Los Angeles 22, Calif., U.S.A. CA Est. **$25,000,000,** OIL REFINERY, incl. 20,000 b/d cat cracker gas concentration and polymerization units, power plant, dock, MAZATLAN, MEXICO. Petroleos Mexicanos, Mexico City, Mexico. Universal Oil Products, 30 Algonquin Rd., Des Plaines, Ill., U.S.A., engrs.

▲ **Arthur G. McKee & Co.,** 2300 Chester St., Cleveland, O., U.S.A. Est. **$25,000,000,** fluid coking type OIL PLANT, Rosarito Beach, MEXICO. Petroleos Mexicanos, Mexico City, Mexico. Esso Research & Engineering Co., U. S. Hy. 1 and Park Ave. S., Linden, N. J., U.S.A., engr.

FOREIGN

BUILDINGS—BA

▲ **Luxembourg, Luxembourg City**—BA 10/21—Ministry P. Wks., 4 Bd. Roosevelt, Luxembourg City, 22 story ADMINISTRATION BLDG. for European Coal and Steel Community. CD 8/28/61.

For additional reports see CONSTRUCTION DAILY REPORTS SECTION

PROPOSED PROJECTS

WATER SUPPLY

▲ **Calif., San Francisco—City and San Francisco Co., City Hall, $115,000,000 bond election Nov. 7,** WATER DEVELOPMENT, incl. storage at Hetch Hetchy, DAMS, tunnels, pipe lines for city and Peninsula and South Bay areas. CD 11/11/55.

▲ **Colorado**—Ute Water Conservancy Dist., 1025 N. 4 Grand Junction, voted $11,850,000 bonds Aug. 29, complete WATER SUPPLY SYSTEM, incl. supply, treatment transmission and distribution facilities to service approx. 23,000 in Mesa County, **$12,000,000.** CD 3/24/61.

▲ **N. J., Wayne**—Passaic Valley Water Comn., 1525 Main Ave., Clifton, RESERVOIR, Pancake Hollow. **$5,000,000.** Clinton Bogert Engineers, 145 E. 32nd St., New York, N. Y., consult. engrs. Richard Bonyum, c/o owner, ch. engr. CD 5/16/60.

SEWERS, WASTE DISPOSAL

▲ **N. J., Florham Park** — Sewerage Authority Borough Florham Park, Municipal Bldg., SEWERAGE SYSTEM. **$3,000,000.** John DiMarzo, Municipal Bldg., staff engr.

▲ **N. J., Trenton**—City Dpt. P. Wks., City Hall, STORM SEWERAGE SYSTEM for Chambersburg, Villa Park and Wilbur sections. **$3,500,000.** Clinton, Bogert Engineers, 145 East 32nd St., New York, N. Y., consult. engrs. CD 5/29/61.

▲ **N. Y., Brewster**—Town of Southeast, Brewster, SEWERAGE SYS., Town of Southeast, **$3,705,000;** SEWERAGE SYS. and TREATMENT PLANT, Brewster Heights, **$605,000.** Goodkind & O'Dea, 1214 Dixwell Ave., Hamden, Conn., consult. engrs. CD 8/29/61.

UNCLASSIFIED

▲ **Miss., Gulfport** — Bd. Supervs. Harrison Co., Court House, Phase 5, INDUSTRIAL SEAWAY PROJ. Channel from Bernard Bayou to Gulfport Lake; 755 acre heavy industry site, 76 acre light industry sites; 85 acres filled 3,730,000 cu. yd. from excav., dredging, access road, water sys., sewerage sys., road imprvts., railroad constr., site clearing, etc. **$3,137,654.** Bedell & Nelson Engineers, Inc., 1414 23 Ave., Gulfport, Miss. and 840 Union St., New Orleans, La., consult. engr. CD 10/27/60.

▲ **O., Cincinnati**—City, City Hall, plans by A. M. Kinney, Inc., Vernon Pl., vote referendum, Nov. 7 election, UNDERGROUND PARKING GARAGE, Government and Fountain Squares, **$8,000,000.** CD 2/16/59.

▲ **Va., South Norfolk**—Atlantic Cement Co., (sub. Cerro Corp.), 300 Park Ave., New York 22, N. Y., sixteen 190 ft. high DRY CEMENT STORAGE SILOS, WHARF, Money Point. **$5,000,000.**

PUBLIC BUILDINGS

▲ **Calif., Newark**—Newark Elem. School Dist., 6135 Thornton Ave., $3,750,000 bond election Oct. 24, SCHOOLS, **$6,750,000.** Falk & Booth, 16 Beale St., San Francisco, archts.

▲ **Calif., San Francisco**—San Francisco P. Utility Comn., City Hall, plans by Gould & Degenkolb, 149 California St., and Edward B. Page, 400 Montgomery St., San Francisco, Calif., GARAGE at International Airport. **$18,000,000.**

▲† **D. C., Wash.**—General Services Admin., 19th and F Sts. NW, plans by Perry, Shaw, Hepburn & Dean, 31 St. James St., Boston, Mass., and Shepley, Bulfinch, Richardson & Abbott, 1 Court St., Boston, Mass., FEDERAL OFFICE BLDG., NO. 7, Pennsylvania Ave., 17th St., H St. and Jackson Pl. NW, **$27,450,000,** ($23,700,000 appropriated). CD 11/17/59.

▲ **Fla., Lakeland**—City, City Hall, install 3 new type gas turbine generator peaking units, POWER PLANT, **$4,500,000.** Reynolds, Smith & Hills, New Jersey Rd., and Wellman-Lord Eng. Co., Inc., Box 2436, consult. engrs.

▲ **Ill., Chicago**—State Dpt. Mental Health, Springfield, two MENTAL HEALTH CLINICS, Chicago area, **$16,000,000.**

▲ **Ill., Decatur**—State Dpt. Mental Health, Springfield, MENTAL HEALTH CLINIC, **$6,000,000.**

▲ **Ill., Rockford**—State Dpt. Mental Health, Springfield, STATE MENTAL HEALTH CLINIC, **$8,000,000.**

▲ **Ill., Springfield**—State Dpt. Mental Health, Springfield, MENTAL HEALTH CLINIC, **$8,000,000.**

▲ **Minn., Roseville (P.O. St. Paul)**—Bd. Educ. Independent School Dist. No. 623, **$3,500,000** bond election Nov. 14, SENIOR HIGH SCHOOL, ELEMENTARY SCHOOL, Little Canada and Alexander Ramsey HIGH SCHOOL ADDN. Setter, Leach & Lindstrom, Inc., 133 Foshay Tower, Minneapolis, archt.

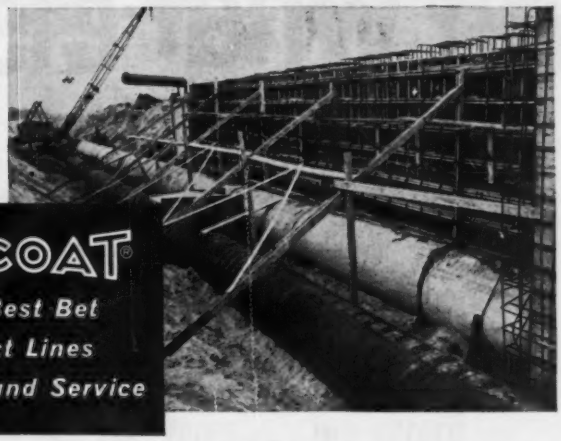
▲ **Mo., Kansas City**—State, Capitol Bldg., Jefferson City, preliminary survey by Kivett & Myers & McCallum, 1016 Baltimore, Kansas City, Mo., STATE OFFICE, 13 and Cherry. **$3,300,000.** Bids June 1962.

▲† **Nev., Mercury**—Atomic Energy Comn., Germantown, Md., and National Aeronautics & Space Admin., 1025 Connecticut Ave. N.E., Wash., D. C., plans by Vitro Engineering Co., engr.-archt., 261 Madison Ave., New York 16, N. Y., NUCLEAR ROCKET ENGINE, MAINTENANCE, and DISASSEMBLY BLDG., at National Nuclear Rocket Development Center, Nevada Test Site, Jackass Flats. **$6,000,000.**

▲ **N. J., Woodbridge**—State Dpt. Institutions & Agencies, State House, Trenton, plans by Vincent G. Kling, 917 Corinthian Ave., Phila., Pa., and Diehl & Stein, 40 Witherspoon St., Princeton, 100-bed HOSPITAL; 29 COTTAGES, FOOD SERVICE, MAINTENANCE and ACTIVITY BLDGS., four STAFF RESIDENCES, ROADS

(Continued on page 84)

NO PLACE TO GAMBLE



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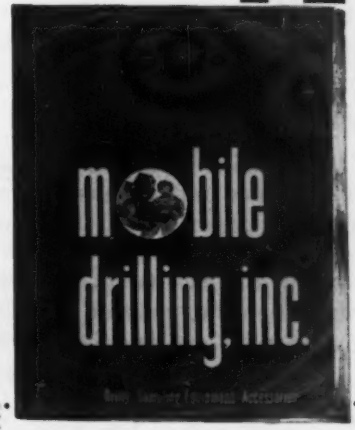

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FULL-POWER SHIFT Euclid's first use of power shift was in "twin power" models in 1946; has been a feature of all torque converter rear-dumps, scrapers and bottom dumps since that time; "standard" on all "Euc" crawlers since 1954 . . . 15 years of field experience!

HYDRAULIC SCRAPER OPERATION bowl, apron and ejector operation of Euclid scrapers has always been hydraulic . . . even those models built prior to World War II utilized hydraulic lever action . . . basic hydraulic design of current models was first announced in 1948.

PLANETARY DRIVE a Euclid feature on rear-dump and bottom-dump haulers since the middle 30's, on all "Euc" self-propelled machines that have been introduced since, including scrapers and crawler tractors.

ALL-WHEEL DRIVE Separate engines, torque converters and semi-automatic transmissions for each of 2 drive axles have been used in "Euc" Rear-Dumps and "Twin" Scrapers since 1948 . . . overhung engine scrapers with power on all four wheels were introduced in 1954.

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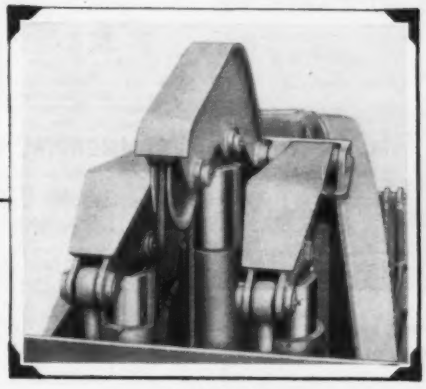
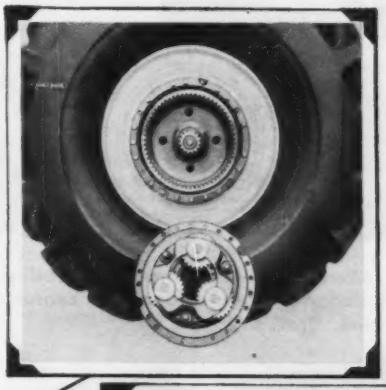
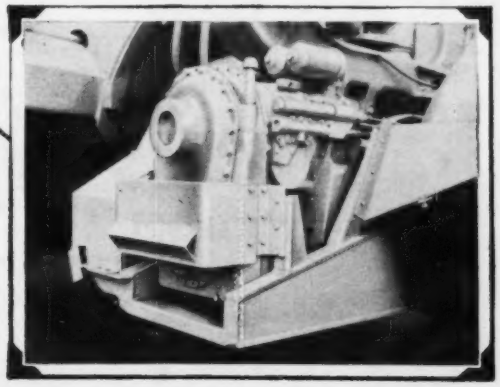
new in 1946!



new in 1948!



new in middle '30's!



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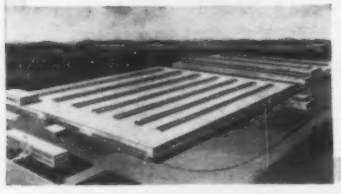

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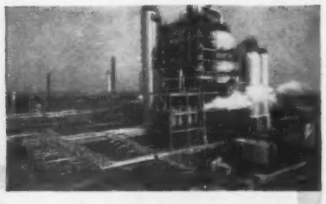
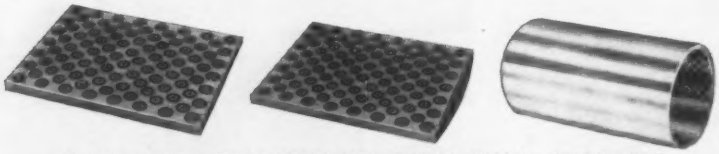
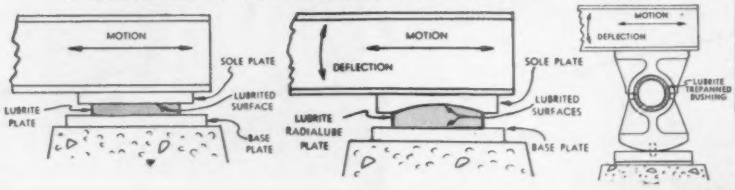
- Eliminate maintenance
- Low coefficient of friction



Lubrite offers positive assurance of self lubricating security in all installations where expansion, contraction and/or rotation are factors.



3 BASIC LUBRITE ASSEMBLIES FROM MANY AVAILABLE



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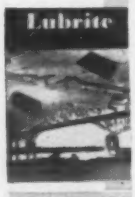
Manual No. 56 covers Lubrite bushings, bearings and washers for use in machinery, industrial equipment, hydro-electric projects, missile and atomic energy and high temperature applications.



LUBRITE DIVISION
MERRIMAN BROS., INC.
185 Amory Street, Boston 30, Mass.

(Continued from page 81)

and approaches and site work, 65 acre tract south-central portion of Township for Woodbridge State School. **$13,154,438.**

▲ **Tex., Dallas**—Dallas County, Comrs. Court, Courthouse, voted **$18,500,000** bonds Sept. 23, 11½ story COURTS and JAIL, Jackson, Market, Commerce and Houston Sts., incl. seven sub-courthouses in Richardson, Garland, Mesquite, Lancaster, Grand Prairie, Irving and Oak Cliff. CD 8/30/61.

▲† **Tex., Houston**—National Aeronautics & Space Administration, 1520 H St. N.W., Wash. 25, D. C., MANNED SPACE FLIGHT RESEARCH LABORATORY, area Clear Lake, **$60,000,000** (appropriated).

▲ **Tex., San Antonio**—University of Texas, Bd. Regents, Main Admin. Bldg., Austin, plans by Bartlett Cocke, 3501 Broadway Ave., San Antonio, Phelps & DeWees & Simmons, 342 W. Woodlawn Ave., San Antonio, and Ellerbe & Co., 333 Sibley St., St. Paul, Minn., MEDICAL HOSPITAL and TEACHING SCHOOL, **$6,500,000.** CD 4/30/59.

▲† **W. Va., Sugar Grove**—Dist. P. Wks., Office, Fifth Naval Dist., Rm. 307, Bldg. N-26, Naval Base, Norfolk 11, Va., BUILDINGS, UTILITIES, NAVAL Radio Research Office, **$36,600,000** (appropriated). CD 10/27/59.

▲ **New Brunswick**—New Brunswick Electric Power Comn., Fredericton, 50,000 kw THERMAL POWER PLANT, Newcastle Creek, on Grand Lake, **$10,000,000.** Constr. late 1962.

▲ **Ont., Toronto**—Bd. Educ., 155 College St., 6 story Jarvis JUNIOR VOCATIONAL SCHOOL, 361 Jarvis St., **$3,750,000,** CD 6/12/61; plans by James A. Murray & Henry Fliess, 224 Merton St., Boulton Ave. JUNIOR VOCATIONAL SCHOOL, **$1,270,000,** CD 2/6/61; plans by Page & Steele, 72 St. Clair Ave. W., 2 story, bsmnt Central HIGH SCHOOL of COMMERCE ADDN., Shaw St., **$1,905,000,** Seto, Shienfield & Assocs., 974 Eglinton Ave. W., Toronto, consult. engrs.; plans by Fleury, Arthur & Barclay, 76 Avenue Rd., HIGH SCHOOL, 74 Castle Frank Rd., **$1,200,000.**

▲ **Ont., Toronto**—Metropolitan Toronto Housing Co., Ltd., and Municipality of Metropolitan Toronto, 67 Adelaide St. E., approx. 1,500 unit LOW RENT HOUSING, Jane and Keele Sts. Over **$10,000,000.**

COMMERCIAL BUILDINGS

▲ **Calif., Redondo Beach**—U-Mac Management Corp., 610 E. 17 St., Santa Ana, plans by Victor Gruen & Assocs., 135 S. Doheny Dr., Beverly Hills, 12 story, reln.-con high-rise SKY APARTMENTS and GARAGE. **$3,800,000.** Constr. early 1962.

▲ **Nev., Reno**—First National Bank of Nevada, 206 N. Virginia St., plans by Langdon & Wilson, 3324 Wilshire St., Los Angeles, Calif., and Ferris & Erskine, assocs archts. 458 California Ave., 16 story, glass, aluminum OFFICE, **$4,500,000.** Constr. to start April 1962.

▲ **N. J., Hazlet**—Lamond Constr. Co., Inc., 110 W. 42 St., New York 36, N. Y., plans by Leo Kabis, 5 E. Main St., Denville, 200-bed Bayshore General HOSPITAL, Holmdel-Keyport Rd. **$4,000,000.**

▲ **O., Dayton**—Children's Hospital Society of Dayton, c/o Mrs. George Mead, 1000 Runnymede, 100-bed HOSPITAL, North Dayton, **$3,750,000.** CD 3/10/59.

▲ **Tex., Dallas**—Sanger-Harris Dpt. Stores, Main and Lamar Sts., 600,000 sq. ft., masonry DEPARTMENT STORE, GARAGE, **$5,000,000.**

▲ **Alta., Calgary**—Imperial Oil Co., Ltd., 111 St. Clair Ave. W., Toronto, Ont., OFFICE. **$3,500,000.**

▲ **Que., Quebec City**—Laval University, 6 story DORMITORY DINING HALL. **$3,255,000.** CD 1/2/48.

INDUSTRIAL BUILDINGS

▲ **N. Y., New York**—Consolidated Edison Co., 4 Irving Pl., New York, Zone 3, East River Electric GENERATING STATION EXTENSION, E.14 St.

AMERICANS ABROAD

▲ **Australia, Springvale**—Gillette Safety Razor Co. Pty. Ltd., 287 Victoria Rd., Rydalmere, Australia, subsidiary of Gillette Safety Razor Co., 15 W. 1 St., Boston, Mass., U. S. A., FACTORY and OFFICES. **$3,260,000.**

▲ **Belgium, Mons**—Parsons & Whittemore, Inc., 250 Park Ave., New York 17, N. Y., U.S.A., PULP MILL, near here. Over **$10,000,000.**

▲ **Philippine Islands**—Bureau P. Wks., Republic of Philippines, Manila, Manila International Port Proj. DREDGING two 1,180 ft. x 335 ft. PIERS, WAREHOUSES. **$29,000,000.** Five Year Program. Michael Baker, Jr., Rochester, Pa., U. S. A., consult. engr. CD 4/29/59.

LATIN AMERICA

▲ **Brazil, Sao Paulo**—National Lead Co., 111 Broadway, New York 6, N. Y., U. S. A., and Companhia Brasileira de Productos Quimicas Copebras, PLANT to manufacture titanium dioxide near Cubatao. **$8,000,000-$10,000,000.**

FOREIGN

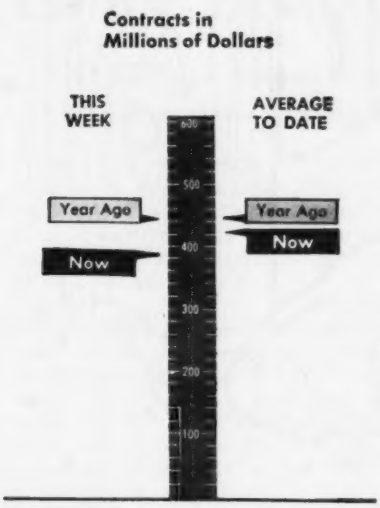
▲ **Jordan, Aqaba**—State Secrtary of Jourdanian Ministry of Transport, Amman, Jordan, HARBOR FACILITIES EXPANSION. **$3,775,000.**

For additional reports see CONSTRUCTION DAILY NEWSLETTER

(Proposal Advertisements see pp. 92 to 96)

Construction Scoreboard

This Week . . .



AMOUNT OF CONTRACTS LET

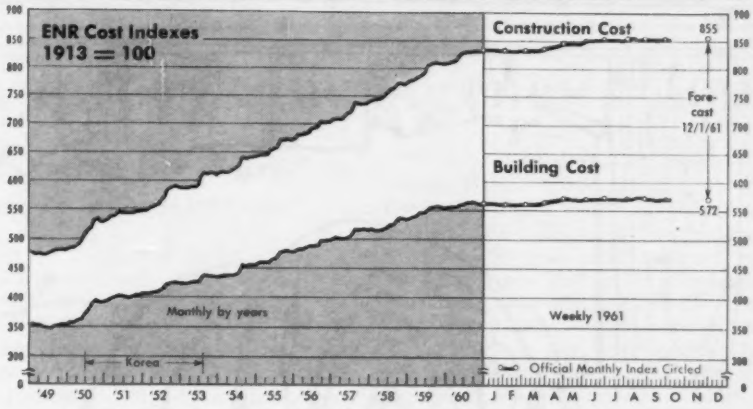
Contracts Awarded In 50 States By Type	This Week millions	Cum. 41 wks 1961	Chge '60-'61 %
All Heavy Construction	$388.9	$17,529.4	− 4
By Ownership			
PRIVATE	193.0	8,582.3	−12
PUBLIC	195.9	8,947.1	+ 5
State & Municipal	168.5	6,989.0	+ 6
Federal	27.4	1,958.1	+ 4
By Type of Work			
PUBLIC			
Waterworks	6.3	307.3	−19
Sewerage	19.4	610.6	+31
Bridges*	14.0	518.5	−22
Highways	57.2	3,036.2	+12
Earthwork, Dams & Waterways	17.9	643.4	+ 3
Buildings:			
Excl. Housing	62.4	2,126.2	+10
Housing	6.1	656.3	+22
Unclassified	12.7	1,049.2	−11
PRIVATE			
Buildings:			
Mass Housing	85.4	3,974.6	−14
Commercial	49.7	2,063.1	+ 5
Industrial	43.6	2,171.6	− 3
Unclassified	14.2	372.4	−60

*Includes Private bridges

NOTE: Minimum size projects included are: Waterworks and waterways, $53,000; other public works, $88,000; industrial buildings, $110,000; other buildings, $400,000.

NEW CONSTRUCTION CAPITAL

	Week of Oct. 5 millions	Cum. 40 wks 1961	Chge '60-'61 %
Corporate Securities	$169.2	$2,697.8	+ 2
State & Municipal:			
All Except Housing	138.2	5,183.6	+ 1
Housing	0	98.9	−48
Federal Loans	4.4	197.4	+24
Federal Aid	0	3,463.6	+27
Total Nonfederal	$311.9	$11,641.3	+ 7
Federal Appropriations:			
Projects in U. S.	0	3,132.4	+23
Outside U. S.	0	89.9	−43
Total New Capital	$311.9	$14,863.6	+ 9



ENR INDEXES (1913 = 100) 20-cities' average	Week of Oct. 5 1961	% Change from Sept. 7 1961	% Change from Oct. 6 1960
Construction Cost	854.08	−0.01	+3.0
Building Cost	570.15	−0.23	+1.4

To convert above indexes to 1926 = 100: Divide Construction Cost by 2.080; Building Cost by 1.850.
1949 = 100: Divide Construction Cost by 4.770; Building Cost by 3.518.

Latest Month . . .

ENR COST INDEXES IN 22 CITIES, 1913 = 100

City	Construction Cost Oct. 1961	Construction Cost Percent Change from last Month	Construction Cost Percent Change from last Year	Building Cost Oct. 1961	Building Cost Percent Change from last Month	Building Cost Percent Change from last Year
Atlanta	647.77	0	−0.3	504.20	0	+0.7
Baltimore	747.48	−1.1	−1.0	555.16	−1.3	−1.0
Birmingham	699.81	+2.9	+3.8	540.75	+1.1	+2.8
Boston	882.42	−0.2	+5.9	591.66	−0.4	+4.4
Chicago	945.11	−0.2	+3.1	592.55	−0.4	+0.2
Cincinnati	862.56	−0.4	+2.2	551.41	−0.7	+0.4
Cleveland	977.75	0	+3.6	575.16	0	+2.6
Dallas	660.32	0	+3.3	531.05	0	+1.4
Denver	776.87	0	+2.7	558.18	0	+1.3
Detroit	984.14	0	+2.1	614.41	0	+1.5
Kansas City	837.88	0	+2.4	561.98	0	+0.6
Los Angeles	939.85	0	+3.5	579.18	0	+1.8
Minneapolis	912.84	0	+2.5	586.65	0	+3.2
New Orleans	669.71	0	+4.7	516.70	0	+1.8
New York	1,074.04	−0.3	+3.4	666.38	−0.5	+2.8
Philadelphia	841.34	−0.3	+1.3	586.31	−0.4	+0.2
Pittsburgh	913.94	+1.8	+3.3	634.14	+0.6	+2.1
St. Louis	915.42	0	+2.2	580.62	0	+0.3
San Francisco	912.64	−0.3	+3.4	566.43	−0.8	+1.1
Seattle	887.25	0	+3.8	518.77	0	+2.5
U. S.—20 Cities' avg.	854.48	+0.06	+2.3	570.55	−0.1	+1.6
Montreal	640.99	0	−1.4	456.68	0	−2.0
Toronto	701.17	0	+1.3	493.30	0	+0.2

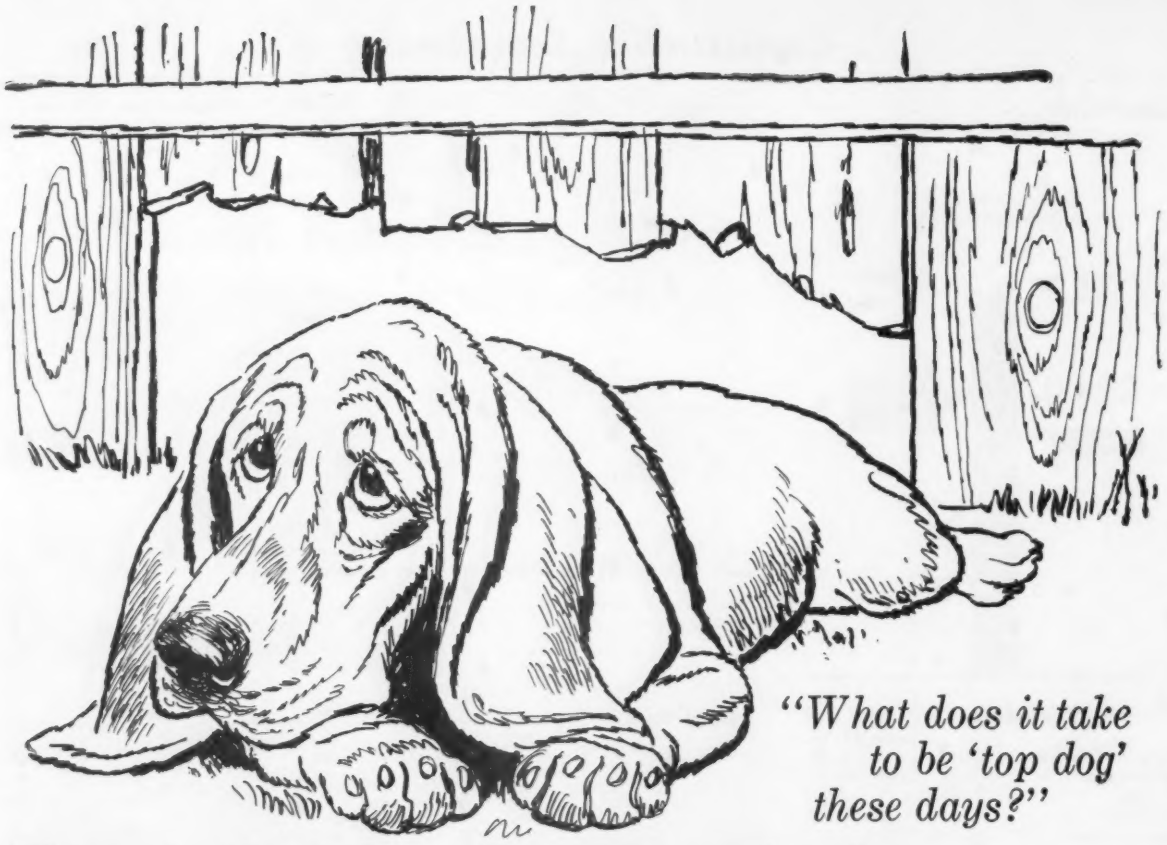
CONTRACTS AWARDED

	1961 Sept. (millions)	1961 9-Mos. (millions)	Percent Change from 1960 Sept.	Percent Change from 1960 9-Mos.†
Total U. S. (ENR reported)	$1,657	$16,690	− 7	− 3
Private	862	8,146	− 7	−10
Public	795	8,544	− 7	+ 5
State and Municipal	684	6,632	− 4	+ 6
Federal	111	1,912	−24	+ 4
ENR Volume Index, 1913 = 100	549	603	− 9	− 4

NEW CONSTRUCTION CAPITAL

Total U. S.	4,074	14,552	+130	+11
State and Municipal Bond Sales	434	5,144	+ 2	− 1
Corporate Security Sales	211	2,529	−35	+ 7
Federal Loans, Aid (nonfederal work)	478	3,657	+1340	+27
Federal Appropriations, (federal work)	2,951	3,222	+198	+19

* Includes funds for outside U. S.
† Based on average week: 4 weeks in September 1961, 5 weeks in September 1960; 39 weeks in the first nine months of 1961 and 1960.



"What does it take to be 'top dog' these days?"

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Yes, you can help yourself to more profitable bidding—with an assist from *Dodge Reports*. Here's what *Dodge* can mean to you:

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Dodge Reports are individual project reports. They're mailed to you daily. You get *Reports* only on the types of building you're interested in—in the area where you do business. They tell who's going to build what and where... whom to see... when bids are wanted on each stage of construction... who else is bidding.

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City_____ Zone____ State_____

Labor Board Approves the Agency Shop

NLRB says unions need not carry "free riders." It also broadens rule on voting in union elections.

Two pro-union decisions just handed down by the National Labor Relations Board have changed—and complicated—some of the law under which labor relations men in the construction industry have been operating.

In one case, the newly reconstituted NLRB, reversing the old Eisenhower board, has placed its stamp of approval on the agency shop clause in labor contracts. It said that an employer must bargain on the issue, when requested to do so by a union, at least in Indiana and presumably in other states with similar right-to-work laws.

Under the agency shop, workers who refuse to join voluntarily the union that represents them must share in the costs of representation by paying the union the equivalent of union dues, fees and other assessments. It is a device for getting around some of the state right-to-work laws that ban compulsory unionism by outlawing the union shop.

In the other case, the Board recognized the intermittent nature of construction employment and liberalized its eligibility requirements for voting in a representation election.

The agency shop decision grew out of a dispute between General Motors Corp. and the United Auto Workers Union in Indiana, which is one of the 19 right-to-work law states. GM won the first round when the old NLRB held that GM was not required to bargain on the union's request for an agency shop clause because such a clause is illegal. Various groups, including the Indiana Building and Construction Trades Council, AFL-CIO, asked for review of the decision.

In changing its mind, the Board decided that Congress did not intend to outlaw the practice of obtaining support payments from nonunion members who would otherwise be "free riders." "We have no doubt," a four-man majority of the Board said, "that an agency shop agreement is permissible" under the Taft-Hartley Act.

The Board reasoned that Congress, by allowing the union shop, had necessarily authorized lesser forms of union security clauses as long as the union does not require the discharge of workers for reasons other than nonpayment of dues and fees.

Former Board Chairman Boyd Leedom, in a vigorous dissent, called the decision unsound. He took the position that any worker who has to contribute to a union's support without being entitled to all the benefits union members receive is, as a practical matter, coerced into joining the union—and this the law prohibits, except in a legal union shop situation.

Mr. Leedom pointed out that the decision throws the right-to-work issue into a state of grand confusion. He implied that unions and employers should follow it only with the greatest caution.

The need for caution lies largely in:

- The new ruling applies only in Indiana, where the right-to-work law specifically outlaws the union shop but not the agency shop.
- It does not answer the question of whether a state, in exercising the Taft-Hartley Section 14(b) right to ban the union shop, may also ban the agency shop. (Several states like Alabama, Nevada, North Dakota and Nebraska have banned both, by law or judicial edict.)
- The ruling does not apply to unions that engage in closed shop practices—and this would include those that practice racial discrimination.

The result is that the decision increases the calculated risks of unions and employers, and promises to make the right-to-work wheels spin faster on both the legislative and judicial fronts.

In the representation case, which involved Daniel Construction Co. of Greenville, S. C., the Board admitted that its usual rules are a "meaningless ritual and serve no useful purpose" in the construction industry. The Board's usual rule is that workers eligible to vote in a representation election are those in the unit who were employed during the payroll period immediately preceding date of the NLRB's election order.

In the Daniels case, the Board broadened the rule by setting up two additional eligibility periods:

- Workers employed by the company during at least 30 days in the twelve-month period prior to the usual payroll eligibility period may vote.
- Workers who fail this test but who have worked 45 or more days within the period of 24 months immediately preceding the usual eligibility period may vote if they have had some employment with Daniels in the last 12 months.

The Board felt that in view of the intermittent nature of construction employment workers in these two categories did have an expectation of future employment with Daniels, even if laid off at the moment, and did have "a continuing interest in their working conditions which would warrant their participation in an election."

The NLRB order applies to plumbers, pipefitters, pipefitter welders and pipefitter helpers who have been employed by Daniels in a six-state area. The plumbers union seeks to represent them.

Labor in Brief . . .

- **Union conventions** — AFL-CIO leaders converge on Miami Beach, Fla., next month. The Building and Construction Trades Department will hold its 51st regular convention at the Balmoral Hotel, beginning Nov. 29. The AFL-CIO opens its big, fourth constitutional convention at the Americana Hotel on Dec. 7.

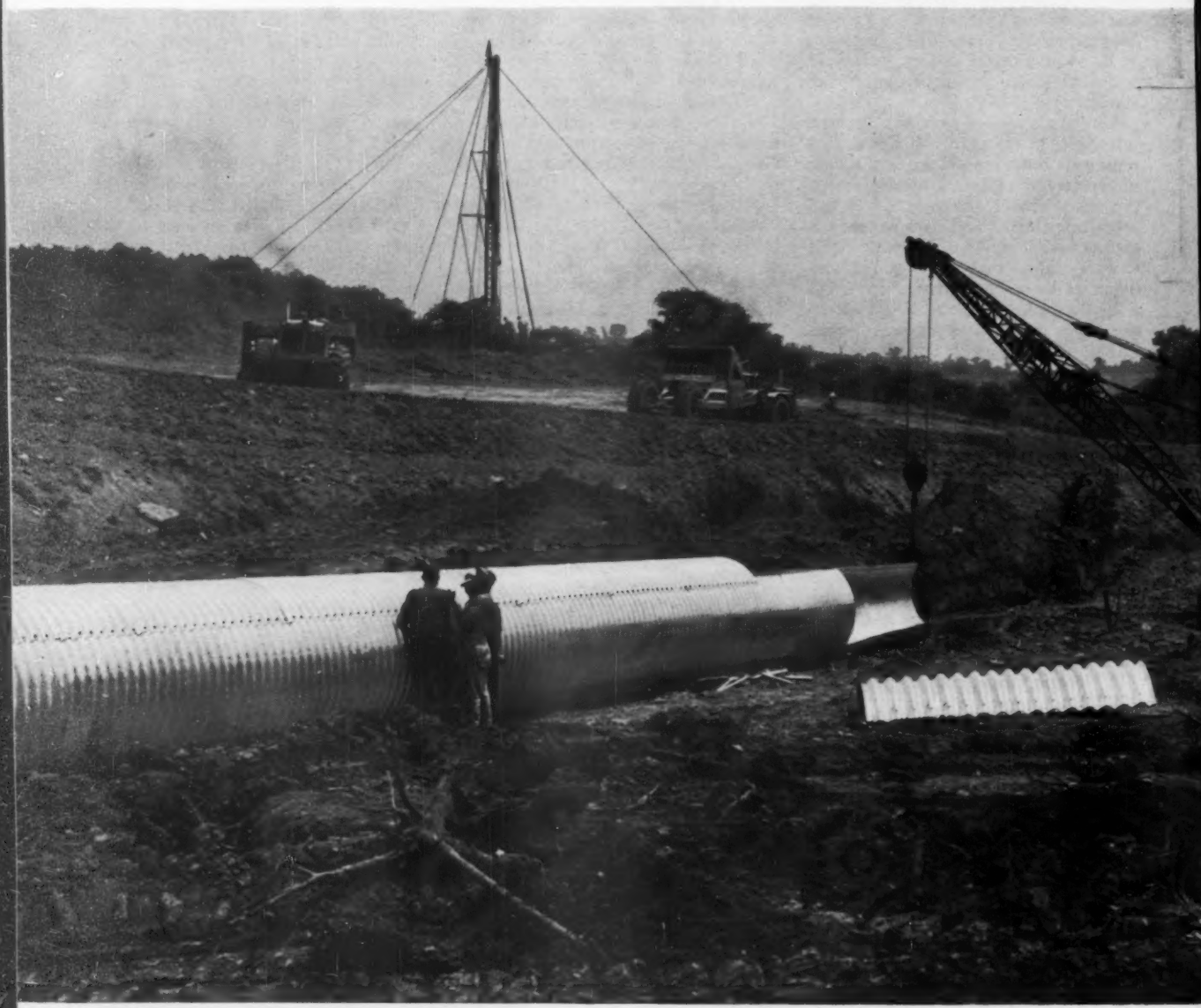
- **"Compulsory" unionism**—In a new attack on the union shop, the Chamber of Commerce has set up a special national committee to promote right-to-work legislation and to oppose labor's efforts to repeal Section 14(b) of the Taft-Hartley Act.

- **Apprenticeship**—The first formal apprenticeship program for operating engineers in 46 northern California counties has been established by the Engineering and Grading Contractors Association, the AGC Northern and Central California Chapter and Local 3 of the operating engineers.

- **Canadian strike**—Structural steel work on building projects across Ontario was shut down earlier this month when members of the Structural Steel Erectors' Association engaged in a lockout as a countermeasure to an iron workers' strike. The union engaged in spot strikes.

. . . . . they're building a "runway"

This 840-ft. installation of 60" USS AMBRIDGE Sectional Plate pipe culvert is being built beneath the runway at the Washington, Pa. Airport. It will drain a stream that runs through a ravine under the landing strip. Workmen aren't wasting a bit of time putting it in. All they do is smooth the grade line, lower the plates into place, bolt them together and backfill. Nobody sits around waiting out expensive curing time and nobody had to put up or tear down forms.



under the airport

USS AmBridge Sectional Plates are strong. They won't crack or break. They are highly corrosion-resistant because they are fabricated from tough copper-bearing steel, corrugated and zinc coated. They are available in a complete range of sizes and meet all federal and state specifications. Solve your drainage problems with American Bridge Highway Products. Contact one of our offices for literature and information.

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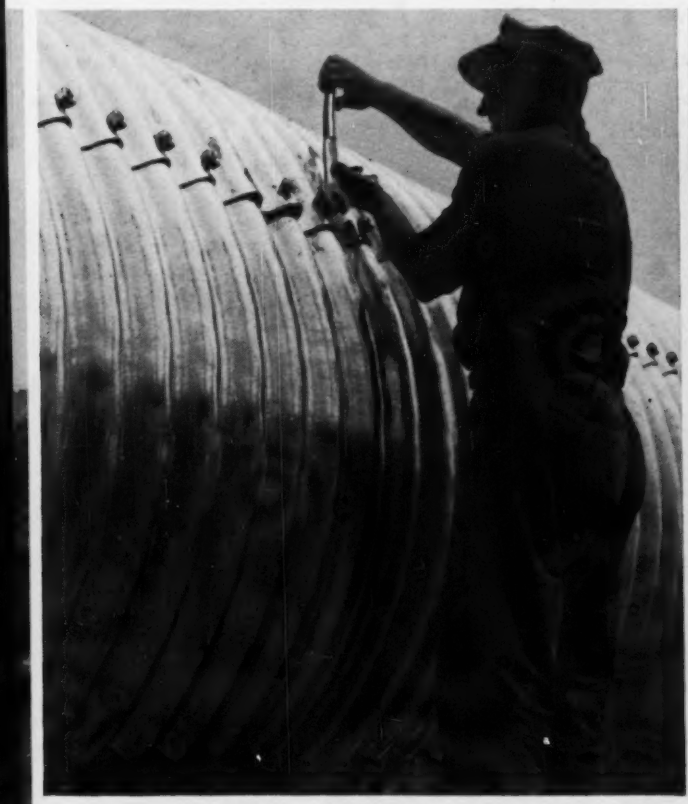

Many hours of installation time are saved because USS AmBridge Sectional Plates can be easily bolted together.

USS AmBridge Sectional Plates are heavily galvanized for long life. Some have been in the ground for 30 years and still look almost new.

(Left) A crane lowers a USS AmBridge Sectional Plate culvert quickly into place. Backfilling will complete the installation.

Contractor—Indyke Construction Co., Houston, Pa.

This mark tells you a product is made of modern, dependable Steel.

How Companies Fared in First Half†

COMPANY	REVENUES (thousands—000 omitted) '61	'60	% Change '60-'61	NET PROFIT (LOSS) (thousands—000 omitted) '61	'60	% Change '60-'61	% PROFIT MARGIN on Revenues '61	'60
Arundel Corp., Baltimore	$18,609	*	.....	$ 188	$ 721	−73.9	1.0	....
Dravo Corp., Pittsburgh	43,758	$46,407	− 5.7	730	779	− 6.3	1.6	1.7
Fluor Corp., Ltd., Los Angeles (a)	91,014	58,415	+55.8	1,603	25	+6,312	1.8	.04
Foster Wheeler Corp., NYC	95,819	79,989	+19.8	1,357	1,211	+12.1	1.4	1.5
General Builders Corp., NYC	3,685	4,081	− 9.7	164	254	−35.4	4.5	6.2
General Development Corp., Miami	33,960	29,168	+16.4	3,923	3,239	+21.1	11.6	11.1
Great Lakes Dredge & Dock Co., Chicago	*	*	.....	525	645	−18.6	....	....
Paul Hardeman, Inc., Stanton, Calif.	38,556	16,638	+131.7	696	158	+340.5	1.8	.9
Kaiser Industries Corp., Oakland, Calif.	81,102	94,451	−14.1	1,097(d)	3,455	.....	(d)	3.7
(Construction and engineering only)	24,513	22,871	+ 7.2					
Lockwood, Kessler & Bartlett, Inc., Syosset, N. Y.	1,109	1,119	#	52(d)	20(d)	.....	(d)	(d)
Macco Corp., Paramount, Calif.	50,639	32,748	+54.6	910	562	+61.9	1.8	1.7
J. Ray McDermott & Co., Inc., Houston	65,776(b)	59,009(b)	+11.5	1,133(b)	215(b)	+427	1.7	.4
Arthur G. McKee & Co., Cleveland	*	*	.....	606	1,258	−55.4	....	....
Merritt-Chapman & Scott Corp., NYC	154,583	181,692	−17.5	4,812	12,968(d)	.....	3.1	(d)
Morrison-Knudsen Co., Boise	133,900	107,709	+24.3	689	1,552	−55.6	.5	1.4
Raymond International, Inc., NYC	59,069	50,159	+17.8	786	1,546	−49.2	1.3	3.1
Stone & Webster, Inc., NYC	16,929	16,678	+ 1.5	3,804	3,699	+ 2.8	22.5	22.2
(Construction & engineering only)	5,618	5,972	− 5.9	.....	.....	.....	....	....
Thompson-Starrett Co., Inc., NYC	10,510	5,213	+101.6	118	246(d)	.....	1.1	(d)
Tishman Realty & Construction Co., NYC	*	*	.....	806	745	+ 8.2	....	....
Utah Construction & Mining Corp., San Francisco	*	*	.....	4,514	4,449	+ 1.5	....	....
Warren Bros. Co., Cambridge, Mass.	22,995	25,977	−11.5	486(d)	261	.....	(d)	1.0
Del E. Webb Corp., Phoenix	29,459	22,450	+31.2	829	553	+49.9	2.8	2.5
Williams-McWilliams Industries, New Orleans	19,079	19,075	#	61(d)	356	.....	(d)	1.9

† 6 mos. ending 6/30 except where noted
** not reported*
 # less than 1%
(a) fiscal 9 mos. ended 7/31
(b) 12 mos. ended 6/30
(d) deficit

Profit Margins Remain Thin

Based on profit margins, publicly owned construction and engineering companies fail to qualify as the fat cats among the nation's industries. Almost all of the reports show either extremely thin profit margins or outright losses.

Out of 23 companies reporting first-half or fiscal period earnings (see table), only four had an after-tax profit margin of more than 3%: Merritt-Chapman & Scott Corp., 3.1%; General Builders Corp., 4.5%; General Development Corp., 11.6%; and Stone & Webster, Inc., 22.5%. Fifteen companies' margins ranged from .5% to 2.8%, with most bunched in the area of 1% to 1.8%. Four companies fell into the red.

Twelve of the corporations did succeed in boosting earnings over last year's comparable period, but 11 companies also saw their net profits shrink or disappear. This stand-off fails to provide a firm indication of the profit trend for the full year.

And despite the money-losing aspects attributed to missile-base contracts, this activity apparently affected adversely only three of the six companies heavily engaged in missile-base construction—Kaiser Industries, Morrison-Knudsen and Raymond International. The three others—Paul Hardeman, Inc., Macco and Del E. Webb—scored impressive percentage gains in profit.

Kaiser Industries' Kaiser Engineers Division hit the company with a loss of $3.4 million in the first half, bringing total recorded losses to $5.4 million. Missile bases drew the blame. And management says additional losses will be recorded before completion of the missile-base jobs.

Raymond and Morrison-Knudsen executives also reported continued cost overruns on missile-base contracts.

The top executives of these three companies all add, however, that equitable cash settlements on missile-base contracts loom on the horizon, some even before the end of this year. And M-K's President, J. P. Bonny also says, "Contrary to the experience of many of our competitors in the field, our missile-base contracts are going to make a little money!"

Generally, the companies with the fatter profit margins, or those that improved their profit margins, operate in areas either removed from construction entirely or related only indirectly to construction.

General Development Corp. derives only slightly more than 25% of its total revenues from actual building, in its case—houses. The greatest part of total first-half volume of $34 million came from development and subsequent sale of land.

Stone & Webster's construction and engineering revenues represent only a third of total volume. The remainder comes from dividends and interest on investments, securities underwriting and investment and oil and gas holdings.

Macco and Del E. Webb Corporations, both of which improved their profit positions by impressive amounts, also rank as good sized land developers.

(*Continued on p. 91*)

Diversification apparently helps maintain or improve a company's financial position, provided the company executives plot the expansion course carefully.

Too rapid expansion can prove damaging. Yuba Consolidated Industries of San Francisco (not included in table) offers one example of a company that encountered troubles in spreading out and growing too rapidly. In 1956 it increased its three operating divisions—largely heavy construction, steel fabrication and erection—to 17 through acquisitions. Sales leaped from $9 million in 1956 to $93 million in 1960. But last year the company reported a net loss of $2.9 million and so far this year may be in the red by more than $2 million.

To forestall complete collapse, Yuba filed a court petition for relief under Chapter 11 of the Federal Bankruptcy Act.

Under a court arrangement, Yuba gets the time and necessary credit to help it complete $40 million worth of heavy construction on the books. Meanwhile, the company sold two manufacturing divisions. Over-diversification and some missile-base contracts share the blame for this company's difficulties, according to its executives.

Power Transmission Grid To Cost $8 Billion

Investor-owned electric companies plan to spend nearly $8 billion for new power transmisison facilities by 1970. The expenditures will represent twice the present investment of $6.7 billion.

While executives refrain from labeling the program "an answer" to a public nation-wide interconnected power grid, they see their program as the "best possible approach" to public-power arguments.

The outlays will pay for about 100,000 miles of transmission lines making all major systems able to operate on an interconnected basis throughout the U. S.

Now, almost all the electric systems east of the Rockies, including 100 companies in 32 states, interconnect.

Utility executives urge that before the government initiates any transmission projects, officials and Congress should consider the program planned by the investor-owned utilities.

Some apparently ignored plans of the power companies; the House has approved $13.7 million for a federal power transmission system to carry power from federal dams across five western states to cooperatives and other groups.

Business in Brief . . .

• **Bid letting**—A contract will be let October 27 for the superstructure of the new bridge between Louisville, Ky., and Jeffersonville, Ind. The federal government will pay 90% of the cost and each state will pay 5%. There was doubt about Kentucky's ability to pay because all its federal fund allotments were used up. However, Kentucky's share will be financed through a bond issue reserve.

• **Bond sale**—The Michigan State Highway Department plans to sell a $35-million highway construction bond issue October 24. This is part of a bond issue sale series to finance 37 state highway construction projects costing $521 million.

• **Gas costs money**—The nation's gas industry will spend close to $2 billion for construction this year, according to the American Gas Association.

• **Steel spending**—Lukens Steel Co., Coatesville, Pa., will build a second 100-ton electric furnace at a cost of $6.3 million.

• **The bloom is off the boom**—Hawaii's construction boom has slowed down, according to the General Contractors Association of Hawaii. GCA says government and commerical building totaled $107 million through June. Last year, their figure was $160 million for the same period.

• **Big city, big budget**—New York City's capital budget requests for 1962 total $1.3 billion. About $700 million would go for actual construction, with the balance going toward subway cars, electrical equipment land acquisition.

• **Building proposals**—Virginia's Capital Outlay Commission proposes that the state spend $115.6 million over six years for state buildings and institutions.

• **The pay-off**—Philadelphia's city-subsidized, low-fare commuter trains carried about 3.3 million riders during the first half of 1961, an increase of 44% over the number of riders before the subsidy began.

OFFICIAL PROPOSALS

Bids: November 1, 1961

The Illinois Central Railroad Company

NOTICE TO BIDDERS

The Illinois Central Railroad Company will receive sealed bids until 2:00 P.M., Central Standard Time, on November 1, 1961, at the office of J. M. Trissal, Vice President and Chief Engineer, 135 East Eleventh Place, Chicago 5, Illinois, for the construction of track roadbed and other related items of work, for approximately 14.4 road miles of main and other track located in Lyon, Livingston and Caldwell Counties between Grand Rivers, Kentucky, and Dulaney, Kentucky, in connection with the Barkley Dam Project being constructed on the Cumberland River by the U. S. Army, Corps of Engineers, Nashville, Tennessee, District.

The estimated quantities of the principal items are 1,929,500 cubic yards of excavation, 72,900 tons of crushed stone subballast, 35,955 tons of rip rap, 7,657.2 cubic yards of reinforced concrete, 747,266 pounds of reinforcing steel, 1,076,736 pounds of structural steel and 9,530 lineal feet of culvert pipe of various sizes and types.

Plans, specifications, etc., can be obtained from the office of the Vice President and Chief Engineer or from W. W. Arnett, Project Engineer, Illinois Central Railroad Company, Kuttawa, Kentucky.

A charge of $125.00 for each set of plans and specifications will be made. Payment should be made in the form of a certified check made payable to the Illinois Central Railroad Company. The deposit, less a deduction of $25.00 per set, to cover cost of handling, will be refunded to bonafide bidders, provided the plans, specifications, etc., are returned in good condition to the Project Engineer not later than ten (10) days after the date the bids are opened.

Plans and specifications can be reviewed by interested bidders at the following locations:

F. W. Dodge Corporation,
1522 Laurel Street,
Nashville, Tennessee.
F. W. Dodge Corporation,
3005 Third Avenue, South,
Birmingham, Alabama.
Builders Exchange of Louisville,
120 East Brandeis,
Louisville, Kentucky.

U. S. Government

INVITATION FOR BIDS: Sealed bids, in triplicate, will be received at the office of the Regional Director, CFA, Housing and Home Finance Agency—OA, Room 805, 346 Broadway, New York 13, N. Y. until 2:00 o'clock p.m. (E.D.S.T.), on the 24th Day of October 1961 and then publicly opened and read aloud for furnishing all labor and material and performing all work for the construction of a new Elementary School building and alterations and additions to an existing Elementary School building at the United States Military Academy, West Point, New York, (Housing and Home Finance Agency Project No. NY 60-C-FED-1-A10) including General Construction, Heating and Ventilation, Plumbing, Electrical Work and Fixtures and Site Work. The Instructions to Bidders, Form of Bid, Form of Contract, General Conditions, Specifications, Plans, Form of Bid Bond, Performance and Payment Bond may be examined at the office of the project Architect, Kelly and Gruzen, 10 Columbus Circle, New York 19, New York and one copy thereof obtained at said office upon deposit of $15.00 for a complete set of documents to be refunded upon receipt of each set of plans and specifications returned in acceptable condition within fifteen days after the date of award of contract. Such deposit shall be in the form of a certified check, bank cashier's check or postal money order, made payable to the Housing and Home Finance Agency—OA. Additional copies may be obtained upon payment of $40.00 per set. The fee for additional sets will not be refunded. RICHARDSON J. THOMPSON, ACTING REGIONAL DIRECTOR, COMMUNITY FACILITIES ACTIVITIES.

OFFICIAL PROPOSALS

RATE: The rate for Official Proposal advertising is $2.70 per line or fraction set solid. Where the advertisement is set other than solid, the space is measured by total space occupied and charged on basis of 12 lines to the inch.

CLOSING DATE: Friday 10:30 A.M. for issue dated the following Thursday.

SEND COPY TO: Official Proposal Division, Engineering News-Record Class. Adv. Div., P. O. Box 12, N. Y. 36, N. Y.

Bids: October 26, 1961

New York State Road Work

NOTICE TO CONTRACTORS: STATE DEPARTMENT OF PUBLIC WORKS, ALBANY, N. Y.—Pursuant to the provisions of the Highway Law, and special provisions for projects financed with Federal Aid Funds, sealed proposals will be received until ten-thirty o'clock A.M., advanced standard time, which is nine-thirty o'clock A.M., eastern standard time, on the 26th day of October 1961, by Henry A. Cohen, Director, Bureau of Contracts, 12th Floor, The Governor Alfred E. Smith State Office Building, Albany, N. Y., for the following projects:

County	Contract No.	Name	Miles	Type	Deposit	Estimated Cost of Work
DISTRICT No. 1, F. J. Fuller, District Engineer, 353 Broadway, Albany 1, New York						
Saratoga (Int. Trg. Rte. 87)	FISH 61-20	Interstate Route 502, Saratoga Springs to Lake Elizabeth Proj. I-IG-87-3(47)	4.19 (3.29 Acc.)	9" Cement Concrete Pavt. 2 @ 24' Var.=5.31 Mi.; Asphalt Conc.=2.07 Mi.; Misc. Work=0.10 Mi.; 2 Hwy. Gr. Seps. Comp. Plate Girder; 4 Hwy Gr. Seps. Comp. Beam; 2 RR Gr. Seps. Comp. Beam	$265,000 Plans $10	$4,812,000
Schenectady (Int. Trg. Rte. 890)	FITS 61-21	Interstate Route Connection 550 (Michigan Ave. to N. Y. State Thruway, FIC 60-18, FISH 60-9, FISH 58-20). Proj. I-890-5(18)	1.63 (0.62 Acc.)	Traffic Signs and Delineators	$1,600 Plans $5	29,000
DISTRICT No 3, E. E. Towlson, District Engineer, 333 E. Washington Street, Syracuse, New York						
Oswego	FASS 61-13	Salisbury Street (County Road 48) (Sandy Creek and Lacona) Proj. S-617(1)	0.85 (0.06 Acc.)	Asphalt Concrete Ty. 1A	$13,000 Plans $5	237,000
Seneca (Rte. 96)	FARC 61-30	Waterloo Village (Fayette St.) S.H. 1399; Waterloo Vil., S.H. 1211; Waterloo Vil., S.H. 1211A Proj. F-626(7)	0.47	Asphalt Concrete Ty. 2A I-Beam Bridge Widening 2 Prestressed Concrete Bridges	$25,000 Plans $5	456,000
DISTRICT No. 4, B. F. Perry, District Engineer, Barge Canal Terminal, Rochester 1, New York						
Monroe (Int. Trg. Rte. 490)	FISH 61-15 FARAE 61-1 FARC 61-83	Int. Rte. Conn. 580 Rochester Western Expressway (West Side Drive to Buffalo Road); Rochester Airport Expressway, Part 1 (FAI Conn. 580 to Chili Avenue); Chili Rd. Part 1, S.H. 254; Chili Rd. Part 2, S.H. 255 Proj. I-IG-490-2(22); U-1103(3); U-231(18)	2.69 (3.36 Acc.)	9" Cement Conc. Pavt., 2 @ 24' Var.=4.7 Mi.; Asph. Concrete Type 1A=1.19 Mi.; Misc. Work=0.16 Mi.; 4 Brs.—Twin Reinf. Conc. Closed Box; 5 Hwy. Gr. Seps. Comp. I-Beam; 2 RR Gr. Seps. Comp. Plate Girder	$230,000 Plans $10	4,013,000
Monroe (Int. Trg. Rte. 490)	FIRC 61-147	Int. Rte. Conn. 580 (Rochester-Bushnell Basin, Parts 1 & 2, FASH 54-1 & FISH 56-9) Proj. I-490-2(30)	5.19	Chain Link Fencing	$8,000 Plans $5	149,000
Monroe (Int. Trg. Rte. 490)	FIC 61-19	Int. Rte. Conn. 580 Rochester Western Expressway (Rochester City Line to Mount Read Blvd.) Proj. I-490-2(26)	0.87 (1.19 Acc.)	9" Cement Conc. Pavt. 2 @ 36' & 48'=0.73 Mi.; Asphalt Conc.=1.19 Mi.; R.R. G.S. Plate Girder Hwy. Gr. Sep. Comp. I-Beam	$80,000 Plans $5	1,463,000
Monroe (Int. Trg. Rte. 490)	FIM 61-6	Int. Rte. Conn. 580 (Rochester-Bushnell Basin Pt. 3, FISH 58-16) Proj. I-490-2(31)	0.05	Sprayed Urethane Bridge Insulation	$1,200 Plans $5	21,000
Orleans	FASS 61-12	West Lee Street Rd., County Rds. Nos. 92 & 81 Proj. S-242(4)	4.74	Asphalt Concrete	$23,000 Plans $5	411,000
DISTRICT No. 8, M. N. Sinacori, District Engineer, Pleasant Valley Road, Poughkeepsie, New York						
Dutchess (Rtes. 22, 55)	FATS 61-23	Billings-Poughquag, S.H. 8525; Stonehouse-Pawling, S.H. 1677; Pawling-Patterson, S.H. 343; Pawling Village, S.H. 5009; Stonehouse-Stormville, S.H. 1162 Proj. F-1025(4); F-625(6); F-350(25)	8.23 (0.57 Acc.)	Traffic Signs	$2,000 Plans $5	36,000
DISTRICT No. 9, J. C. Frederick, District Engineer, 71 Frederick Street, Binghamton, New York						
Sullivan (Rte. 17)	FARC 61-132	Liberty-County Line, Part 1, S.H. 5223 Liberty-County Line, Part 2, S.H. 5234 Proj. F-336(17)	3.94 (3.76 Acc.)	9" Cement Concrete Pavt., 2 @ 24' W.=3.38 Mi.; Asphalt Conc.=2.93 Mi.; Top Course Broken Stone B.D.S.T.=1.28 Mi.; Fdn. Course Granular Material=0.11 Mi.; 3 Hwy. Gr. Seps. Comp. I-Beam	$245,000 Plans $5	4,475,000
DISTRICT No. 10, A. M. Sarr, District Engineer, 325 W. Main Street, Babylon, L. I., New York						
Bronx (Int. Trg. Rte. 78)	FICBERC 61-1 FITNERC 61-1	Int. Rte. Conn. 513, Contract 5 Cross Bronx Expressway: Throgs Neck Expressway Proj. I-78-1(65)	2.65 (5.04 Acc.)	Roadside Development	$8,000 Plans $5	147,000
Nassau (Rte. 27)	RC 61-150	Conduit Boulevard, Part 3, S.H. 1699A	1.58	Reducing Width of Mall	$6,000 Plans $5	108,000
Queens (Int. Trg. Rte. 678)	FIWE 61-2	Int. Rte. Conn. 515 Whitestone Expressway—Contract 2 (Flushing River Bridge and Approaches) Proj. EI-678-1(67)	0.60 (0.24 Acc.)	Plate Girder Bridge, Approaches & Ramps, Conc. Deck Rdway.=0.72 Mi.; Conc. Pavement=0.10 Mi.; Misc. Work=0.02 Mi.	$350,000 Plans $10	6,069,000
Queens	FAVWE 61-4	Van Wyck Expwy. Ext., Contract 3, (Kew Gardens Interchange) Proj. U-1085(22)	0.57 (1.03 Acc.)	9" Cement Concrete Pvt., 2 @ 48' Var.=1.26 Mi.; Asphalt Conc.=0.15 Mi.; Misc. Work=0.19 Mi.; 3 Comp. I-Beam & Plate Gird. Viads.; 2 Comp. I-Beam Viads.; 1 Hwy. Gr. Sep. Comp. I-Beam; 1 Ped. Overpass Plate Girder	$230,000 Plans $10	4,171,000
Queens (Int. Trg. Rte. 495)	FAGCP 61-5 FIHHE 61-2	Grand Central Pkwy., Section 2, Contract 1 (Roosevelt Ave. to 77th Avenue), Int. Rte. Conn. 514 (Grand Central Pkwy.-Horace Harding Interchange) Proj. U-UG-899(5); I-495-1(48)	3.72 (5.42 Acc.)	8" & 9" Cement Conc. Pavement, 2 @ 48'=3.14 Mi.; 8" & 9" Cement Conc. Pavt. Var.=4.75 Mi.; Asph. Conc.=0.67 Mi.; Misc. Work=0.58 Mi.; Riveted Steel Rig. Fr. Structure Welded Thru Pl. Gird. Struct.; 2 Ped. Overpass Comp. WF Beam; 2 Ped. Overpass WF Beam; 1 Ped. Overpass Welded Plate Girder; 3 Comp. WF Cantilever Suspension; 1 WF Beam Plus Alterations; Widen Exist. WF Beam Br.	$570,000 Plans $10	10,377,000
Queens	FAGCP 61-6	Grand Central Pkwy., Section 1, Contract 1 (Brooklyn-Queens Expwy. to Northern Blvd. Interchange) Proj. U-899(4)	2.67 (4.23 Acc.)	8" Cement Conc. Pavt., 2 @ 48' Var.=4.47 Mi. Asph. Concrete Pavement=2.29 Mi.; Misc. Work=0.14 Mi.; 3 Hwy. Gr. Seps. Comp. I-Beam; 3 Ped. Overpass I-Beam Rehabilitation of I-Beam and Conc. Rigid Fr. Underpass; Rehabilitation of Comp. I-Beam & Girder Viaduct	$650,000 Plans $10	11,290,000

(Continued on opposite page)

OFFICIAL PROPOSALS
(Continued from opposite page)

Any projects in this letting that are on the Federal Aid highway systems are subject to the provisions of the "Federal Aid Highway Act, of 1956", being Public Law 627, 84th Congress, approved June 29, 1956, and are also subject to the applicable New York State statutes.

In compliance with the provisions of Section 115 (Prevailing Rate of Wage), Public Law 627, the minimum wages to be paid laborers and mechanics are included in wage schedules that are set out in the bid proposal.

Maps, plans, specifications and proposal forms may be seen and obtained at the office of the State Department of Public Works, Bureau of Contracts, Albany, N. Y., and at the office of the District Engineers noted above, and may also be seen at the office of the State Department of Public Works, 270 Broadway, New York City.

OFFICIAL PROPOSALS

If the deposit is $10.00 or more, full refund for one copy of the plans and specifications will be made to a bidder for the particular project, if such plans and specifications are returned in good condition within 30 days after the award of the contract or after the rejection of the proposal. The successful bidder is not required to return the copy of the plans and specifications in order to be entitled to such refund. If the deposit is $10.00 or more, partial refund will be made for the return of all other copies of plans and specifications in good condition within 30 days after the award of the contract or the rejection of the proposal.

Special attention of bidders is called to "Information for Bidders" in the Public Works Specifications, and to the special provisions applying to projects financed with federal funds. Award of a contract is subject to priorities and allocations under the Defense Production Act of 1950, as Amended, and all regulations issued thereunder.

Proposal for each contract must be submitted in a separate sealed envelope with the name and number of the contract plainly endorsed on the outside of the envelope. Each proposal must be accompanied by draft or certified check payable to the order of the "State of New York, Department of Public Works" for the sum as specified in the advertisement and the proposal. The retention and disposal of the bid deposit, the execution of the contract and bond shall conform to the provisions of the Highway Law, as set forth in the "Information for Bidders".

The right is reserved to reject any or all bids.

J. BURCH McMORRAN
SUPT. OF PUBLIC WORKS

OFFICIAL PROPOSALS

Bids: October 26, 1961

The International Bridge Authority Of Michigan

Advertisement for Proposals
Contract 8—Concrete Deck, Railings, Drainage and Electrical Work
for
American River Spans
of the
Sault Ste. Marie International Bridge

The International Bridge Authority will receive sealed proposals for the construction of Contract 8—Concrete Deck, Railings, Drainage and Electrical Work for American River Spans of the Sault Ste. Marie International Bridge until 10:00 A.M., Eastern Standard Time on the 26th of October 1961, at City Hall, Sault Ste. Marie, Michigan at which time and place proposals will be publicly opened and read aloud.

The work includes the construction of reinforced concrete deck with bituminous concrete wearing surface, ornamental steel handrails, pipe curbs, side barriers, drainage system and electrical facilities for one 4-span continuous truss unit with arch form top and bottom chords and a suspended roadway with two main spans each of 430 feet and end spans of 200 feet, one 3-span continuous girder unit with equal spans of 244 feet and one 4-span continuous girder unit with equal spans of 165 feet.

The Principal items of work include:

Bituminous Concrete	680 Tons
Grade A Concrete Deck (1683 cu. yds.)	Lump Sum
Lightweight Concrete Deck (669 cu. yds.)	Lump Sum
Steel Reinforcement	551,500 lbs.
Galvanized Wrought Iron Pipe and Fittings	2600 Lin. Ft.
Bridge Railing—Fabrication, Erection and Painting	3575 L.F.
Bridge Railing with Side Barriers—Fabrication, Erection and Painting	1735 L.F.
Pipe Curb—Fabrication Erection and Painting	5315 L.F.
Steel Conduit	13,100 Lin. Ft.
5000 Volt Cable	11,850 Lin. Ft.
Sound Powered Telephone Cable	6,200 Lin. Ft.
Sub-station No. 1	Lump Sum
Service Boxes	33 Units
Roadway Lights	15 Units

Plans, Specifications, Proposal Form and Contract Documents for the work are on file in the office of Steinman, Boynton, Gronquist and London, Consulting Engineers, 117 Liberty Street, New York 6, New York and may be inspected by prospective bidders during office hours.

Plans, Specifications, Proposal Form and Contract Documents may be obtained from Steinman, Boynton, Gronquist and London, Consulting Engineers, 117 Liberty Street, New York 6, New York upon application and payment of a fee to Steinman, Boynton, Gronquist and London, of Thirty-five ($35.00) Dollars, Fifteen ($15.00) Dollars of which will be refunded upon return of the Plans to non-bidders, and all of which will be returned to bidders.

Bids must be made upon the proposal form included in the Contract Documents. Each proposal must be accompanied by draft or certified check payable to the order of the International Bridge Authority for the sum of Thirty Five Thousand ($35,000.00) Dollars.

Only United States Contractors may bid on this Contract.

All bidders shall be prequalified.

The right is reserved to reject any or all bids.

THE INTERNATIONAL BRIDGE AUTHORITY OF MICHIGAN
James E. Brophy, Chairman

September 27, 1961

NOTICE TO CONTRACTORS

Phelps-Dodge Corporation intends to invite bids from pre-qualified contractors for construction of its Blue Ridge Project in Arizona which includes:

(1) Arch dam, about 150 feet high containing about 30,000 cubic yards of concrete;
(2) Pressure pipe line, about 45,000 feet of 33 inch diameter and about 15,000 feet of smaller diameter;
(3) Pumping Plant—about 3200 horsepower;
(4) Hydroelectric Power Plant—about 3300 horsepower;
(5) Transmission line, about 11 miles, 33 kv.

Additional information regarding the Project may be obtained from the Engineer, Leeds, Hill and Jewett, Inc., 609 South Grand Avenue, Los Angeles, California.

Prospective bidders must visit the site of the Project in advance of issuance of plans and specifications because the area is generally inaccessible from November until March. A representative of the Engineer will be available at Pine, Arizona, during October 1961 to conduct interested contractors over the area.

Each prospective bidder must also file with the Engineer a full statement of his experience on all phases of the work and his qualifications to complete the work during the 1962 construction season, together with a recent financial statement and other information reasonably needed for pre-qualification of bidders.

LEEDS, HILL AND JEWETT, INC.
ENGINEER FOR PHELPS DODGE CORPORATION

Bids: January 31, 1962

International Competition

PERU
Power Development "HUINCO"
of the
Lima Light & Power Co.
Lima, Peru

The Lima Light and Power Company is carrying out the scheme for the "Huinco" Power Development which is to utilize the water of the river Santa Eulalia over a net head of 1290 metres for an ultimate power output of 340 MVA. The site of the project is located appr. 60 km northeast of the city of Lima, Peru, at 1900 m above sea level.

Proposals will be received by Motor-Columbus, Electrical Management Company Ltd., Baden, Switzerland, Consulting Engineers of the Lima Light and Power Co., until 31 January, 1962 for the manufacture, delivery and installation of: appr. 9 km (5.6 miles) of oil filled 220 kV HV cable, single phase, rated current 230—250 Amps to be used for the connection of the power transformers, located in the cavern, with the outdoor switching-station. The supply of the necessary cable and boxes is also part of the contract obligations.

The description of the project, the general conditions of tender, the material specification and the general conditions of contract may be obtained at the office of Motor-Columbus Ltd., Parkstrasse 27, Baden, Switzerland, until December 1st, 1961, upon application and payment in advance of a fee of ten (10.-) US-dollars per set of documents, no part of which shall be refunded.

Only manufacturers who can prove a broad experience in the field of HV cable manufacturing shall apply for instructions and submit their tenders.

The right is reserved to reject any or all bids and to accept the bids deemed most favourable to the interest of the Lima Light and Power Co.

Baden, Switzerland, October, 1961 3-Du/sch

Bids: November 28, 1961

Kingdom of Thailand
Royal Irrigation Department
Bangkok, Thailand

INVITATIONS FOR BIDS—No. YS-2-22
ELEVATORS

The Royal Irrigation Department of the Kingdom of Thailand hereby invites sealed written bids for furnishing, delivering, and installing one passenger elevator each in the Bhumiphol Dam and Power Plant, Yanhee Multipurpose Project, Kingdom of Thailand in accordance with Contract Documents, Invitation for Bids YS-2-22.

The passenger elevator in the dam will have a capacity of 2270 kilograms (5000 pounds) with a total lift of 111.22 meters (364.91 feet) at a speed of 500 feet per minute with a total of seven landings.

The passenger elevator in the power plant will have a capacity of 2270 kilograms (5000 pounds) with a total lift of 20.32 meters (66.67 feet) at a speed of 500 feet per minute with a total of six landings.

Bids will be opened at 10:00 A.M., 28 November 1961. Copies of Contract Documents, Invitation for Bids YS-2-22 may be obtained by qualified Bidders on written request on Bidder's letterhead, addressed to:

Royal Irrigation Department
Attention: Thai Liaison Engineer
c/o Engineering Consultants, Inc.
1901 South Navajo Street
Denver 23, Colorado

Each request must be accompanied by a check or money order made payable to the Royal Irrigation Department in the amount of U. S. $5.00 for each copy of the Contract Documents requested. The remittance is nonreturnable.

M. L. Xujati Kambhu
Director General
Royal Irrigation Department
Kingdom of Thailand
Bangkok, Thailand

September 25, 1961

OFFICIAL PROPOSALS enable you to get the greatest variety of bids —and so to get the lowest prices consistent with the best work.

OFFICIAL PROPOSALS

Bids: November 15, 1961

Indus Basin Project
West Pakistan Water and Power Development Authority
Advance Notice of Intent to Invite Tenders for the Construction of Canals and Appurtenant Works

The above Authority advertised in December 1960 regarding the construction of a number of large canals in West Pakistan. Their construction will be furnished through the Indus Basin Development Fund, the operation of which will be administered by the International Bank for Reconstruction and Development (World Bank).

The Authority plans to call for two separate construction tenders on the previously advertised Sidhnai-Mailsi-Bahawal Link Canal instead of a single tender as previously contemplated. One tender will be called for the Sidhnai-Mailsi portion of the canal and a second tender will be called for the Mailsi-Bahawal portion. All contractors who have made previous application and who have been prequalified to receive invitations to tender on the Sidhnai-Mailsi-Bahawal Link Canal will be sent invitations to tender on both the Sidhnai-Mailsi Link Canal and the Mailsi-Bahawal Link Canal. No further request or application from such prequalified contractors will be necessary.

In view of the above change it has been decided that additional contractors not already prequalified by the Authority will be permitted to submit information of their qualifications for undertaking the proposed construction of the Mailsi-Bahawal Link Canal in application for prequalification.

The Mailsi-Bahawal canal will have a length of 13 miles. It will require the excavation of about 4.1 million cubic yards of earth, compaction of 1.7 million cubic yards of embankment and the construction of eleven structures such as regulators, bridges and aqueducts. The capacity of the canal will be 3,900 cubic feet per second and it will be brick lined over most of its length.

The Authority plans to call for tenders for the construction of the Mailsi-Bahawal Link early in 1962. Only contractors who have been prequalified by the Authority will be invited to submit tenders for this purpose. Contractors who wish their names to be included on a list to receive the document for prequalification are requested to submit the following information on or before 15 November 1961 to the Authority's Consultants, Tipton and Kalmbach, Inc., at post office Box 589, Lahore, West Pakistan, with a copy to their office at 831-14th Street, Denver 2, Colorado, U.S.A.:

1. Name of Company or Firm with full address
2. Name and title of person to whom future correspondence should be directed.

The interested contractors will then be furnished with a document describing the work and setting forth the information required from them by the Authority in order to evaluate their qualifications for undertaking the proposed canal construction.

Project Director (Links)
WEST PAKISTAN WATER AND POWER DEVELOPMENT AUTHORITY

Bids: October 30, 1961

Indus Basin Project
West Pakistan Water and Power Development Authority
Advance Notice of Intent to Invite Tenders for the Procurement of Fixed-Wheel Gates

In connection with the construction of a number of large canals and appurtenant structures to be undertaken as a part of the Indus Basin Project in West Pakistan, the above Authority intends to call for tenders for the furnishing of fixed-wheel gates, frames, guides and hoists. The gates and appurtenant equipment will be installed in regulating structures to control and regulate flow of water in the canals. The procurement of the gates and appurtenant equipment will be financed through the Indus Basin Development Fund which will be administered by the International Bank for Reconstruction and Development (World Bank.)

The work will consist of furnishing all labor, services, materials, plant, equipment and supplies required to supply, f.o.b. manufacturer's plant, the required gates. The gates will be of the fixed-wheel type, 24 and 12 feet in width and with heights varying from approximately 10 to 18 feet. Gates higher than 12 feet will be fabricated in sections for field assembly at the site. Each gate is to be furnished complete with gate frame, guides, counterweight frame, and manually operated, cable-drum hoist. Approximately 29 gates will be required in the initial Tender covering gates for the Trimmu-Sidhnai Link Canal, and additional gates of a similar type will be procured for other link canals periodically in the future.

Invitations to submit Tenders, along with Specifications for the work, will be issued only to firms presenting satisfactory evidence of having successfully produced equipment of a similar nature. Those firms who wish their names to be included on a list to receive the Contract Documents and Specifications are requested to submit the following information to the Authority's Consultants, Tipton and Kalmbach, Inc., at Post Office Box 589, Lahore, West Pakistan, with a copy to their office at 831-14th Street, Denver 2, Colorado, U.S.A.

1. Name of Company or Firm
2. Country of Domicile
3. Full address, name and title of person to whom future correspondence should be directed
4. Record of experience on similar work in the form of a "brochure", list of equipment fabricated and other data of a similar nature.

The above information should be sent airmail to reach the offices of the Authority's Consultants on or before 30 October 1961. The firms who have expressed an interest in the work by submitting the required information and satisfactory evidence of competency will subsequently receive the Contract Documents and Specifications and an invitation to submit a Tender for furnishing the gates, frames, guides and hoists for each link canal as the Contract Documents and Specifications are issued.

Project Director (Links)
WEST PAKISTAN WATER AND POWER DEVELOPMENT AUTHORITY

Bids: October 30, 1961

Indus Basin Project
West Pakistan Water and Power Development Authority
Advance Notice of Intent to Invite Tenders for the Procurement of Butterfly Valves

In connection with the construction of a number of large canals and appurtenant structures to be undertaken as a part of the Indus Basin Project in West Pakistan, the above Authority intends to call for tenders for the furnishing of a number of butterfly valves with manual operating mechanisms. The valves and operators will be installed in silt ejection structures to control the ejection of silt from the canals. The procurement of the butterfly valves and operators will be financed through the Indus Basin Development Fund which will be administered by the International Bank for Reconstruction and Development (World Bank).

The work will consist of furnishing all labor, services, materials, plant and equipment required to supply, f.o.b. manufacturer's plant, the required butterfly valves. The valves will be of the horizontal shaft, flanged-type and in the size range of from 48 to 60 inches in diameter. The valves will have metal seats and seals and are to be designed for operation under a head differential of approximately 25 feet. Each valve is to be furnished complete with manual operating mechanism, operating stem, stem guides and gearing. Approximately 28 valves will be required in the initial Tender covering valves for the Trimmu-Sidhnai Link Canal, and additional butterfly valves of a similar type will be procured for other link canals periodically in the future.

Invitations to submit Tenders, along with Specifications for the work, will be issued only to firms presenting satisfactory evidence of having successfully produced equipment of a similar nature. Those firms who wish their names to be included on a list to receive the Contract Documents and Specifications are requested to submit the following information to the Authority's Consultants, Tipton and Kalmbach, Inc., at Post Office Box 589, Lahore, West Pakistan, with a copy to their office at 831-14th Street, Denver 2, Colorado, U. S. A.:

1. Name of Company or Firm
2. Country of Domicile
3. Full address, name and title of person to whom future correspondence should be directed
4. Record of experience on a similar work in the form of a "brochure", list of equipment fabricated and other data of a similar nature.

The above information should be sent airmail to reach the offices of the Authority's Consultants on or before 30 October 1961. The firms who have expressed an interest in the work by submitting the required information and satisfactory evidence of competency will subsequently receive the Contract Documents and Specifications and an invitation to submit a Tender for furnishing the butterfly valves and manual operating mechanisms for each link canal as the Contract Documents and Specifications are issued.

Project Director (Links)
WEST PAKISTAN WATER AND POWER DEVELOPMENT AUTHORITY

District of Columbia—Signing, Anacostia Freeway—Dept. of Highways and Traffic, D. C., October 2, 1961. SIGNING OF ANACOSTIA FREEWAY, E. CAP. ST. TO PENN. AVE. (Federal Aid Project No. U-45(25) and CHESAPEAKE ST. TO D. C. LINE, Federal Aid Interstate Project No. I-295-2(26)0, Invitation No. C-6221-H. (Wage rates have been predetermined by Labor Dept.) This project is located in southeastern section of the District of Columbia, and consists of the signing, reflective pavement marking, and inc. work connected therewith, for the sections of the Anacostia Freeway from E. Cap. St. to Penn. Ave.; the Penn. Ave. Interchange; and the section of the Anacostia Freeway from Chesapeake St. to the D. C. Line. Bid forms, plans and specifications are now available from Supervisor, Bid and Contract Division, Procurement Office, D. C., Room 404, 499 Penn. Ave., N.W., upon deposit of a certified check for $25.00 per set, payable to D. C. Treasurer (Phone NA 8-6000, Ext. 448). SEALED BIDS to be opened 3:00 PM, EST, October 31, 1961, in Room 424, 499 Penn. Ave., N.W.

District of Columbia—Sew. Treatment Plant—Dept. of Sanitary Engineering, D.C., September 26, 1961. MAIN SEWAGE PUMP NO. 5, SEWAGE TREATMENT PLANT, UNIT NO. 3C (Invitation No. C-6247-S), consist. of furnishing an electric-motor-driven centrifugal or mixed flow sewage pumping unit and appurtenances with switchgear and electric control accessories and installing the same upon foundations to be erected under this contract, and furnishing and installing pipe, valves and auxiliary equipment in the sewage pumping station and piping to the grit chamber of the D.C. Sewage Treatment Plant at Blue Plains in D.C. (Wage rates have been predetermined by Labor Dept.) Bid forms, plans and specifications are now available from Supervisor, Bid & Contract Division, Procurement Office, D.C., Room 404, 499 Penn. Ave., N.W., upon deposit of a certified check for $50.00 per set, payable to D.C. Treasurer (Phone NA 8-6000, Ext. 448). SEALED BIDS to be opened 3:00 PM, EDT, October 20, 1961, in Room 424, 499 Penn. Ave., N.W.

Northern Pacific Railway Company. Sealed bids will be received at St. Paul, Minnesota until noon November 6, 1961, for furnishing labor and materials for raising a double track railroad bridge, constructing two new piers, removing 2 spans of deck plate girders, and erecting a new 192 ft. truss span. Bridge is over the Mississippi River in Minneapolis, Minnesota. Principal items are 31,000 lin. ft. timber piling, 2300 cu. yds. concrete and 1,345,000 lbs. structural steel. For particulars, address: M. O. Woxland, Bridge Engineer, Northern Pacific Railway, St. Paul 1, Minnesota.

OFFICIAL PROPOSAL

RATE: $2.70 per line (or fractional) per insertion.

CLOSING DATE: 10:30 a.m. Friday for issue out following Thursday.

SEND COPY: Official Proposal Division, Engineering News-Record, P. O. Box. 12, New York 36, N. Y.

OFFICIAL PROPOSALS

Bids: November 2, 1961

New York State Road Work Interstate Routes 570 & 571

STATE DEPARTMENT OF PUBLIC WORKS, ALBANY, N. Y.—Pursuant to the provisions of Highway Law, sealed proposals will be received until 10:30 a.m., Eastern Standard Time, on November 2, 1961, by Henry A. Cohen, Director, Bureau of Contracts, 12th Floor, The Governor Alfred E. Smith State Office Building, Albany, N. Y., for:

SOIL EXPLORATIONS AND FOUNDATION INVESTIGATIONS AT VARIOUS SITES ON INTERSTATE ROUTE 570, ERICKSON STREET TO EAST SYRACUSE, NEW PROJECT NO. 1-690-3(1)214 AND INTERSTATE ROUTE 571, DeWITT TO COLLAMER, NEW PROJECT NO. 1-281-2(50)84, ONONDAGA COUNTY, WHICH CONSTITUTES CONTRACT SPEC. NO. FA-SM-187.

Maps, plans and specifications may be examined and obtained at the following offices:

(a) Bureau of Contracts, 12th Floor, The Governor Alfred E. Smith State Office Building, Albany 1, New York.
(b) Mr. Earle E. Towlson, District Engineer, New York State Department of Public Works, 333 East Washington Street, Syracuse, New York.
(c) Mr. William Mende, Principal Building Construction Engineer, Department of Public Works, 270 Broadway, New York City.

The deposit for a set of plans, specifications and proposal forms is $5.00. Refunds of deposits for plans, specifications and proposals will be made only in case the deposits of individual sets are $10.00 or more, per Chapter 835, Laws of 1960.

The Engineer's Estimate of cost for this work is $42,625.00.

Proposal for this contract must be submitted in separate sealed envelope with the name of the contract plainly endorsed on the outside of the envelope. Proposal must be accompanied by draft or certified check, payable to the order of the "State of New York, Department of Public Works" for the sum of $2,250.00. The retention and disposal of the bidding check, the execution of the contract and bonds shall conform to the provisions of the Highway Law as set forth in "Instruction to Bidders".

The right is reserved to reject any or all bids.

J. BURCH McMORRAN
SUPERINTENDENT OF PUBLIC WORKS

Bids: November 13, 1961

Notice to Bidders
Proposed Improvements to Sanitary Sewerage System of Federalsburg, Maryland

Sealed bids for the construction of Proposed Improvements to the Sanitary Sewerage System, consisting of intercepting sewers, sewage lift and pumping stations, force mains, sewage treatment plant, and outfall sewer (Schedule A), and house connections and sewage metering stations (Schedule B), under Project No. WPC-Md-21, will be received by the Mayor and Council of Federalsburg at their office located at 203 North Main Street in Federalsburg, Maryland, until 2:00 P.M. (E.S.T.) Monday, November 13, 1961, at which place and time the bids will be publicly opened and read aloud.

The bidder shall bid on both Schedules A and B as no separation of the schedules will be considered in the award of the contract. A summary of major items and the approximate quantities applicable to unit items are as follows:

SCHEDULE A

8266 lin.ft. 6", 8", 10", 12", 14", 18", 21", and 24" Clay Pipe and Cast Iron Sewers; 3830 lin.ft. 6", 8", and 12" Cast Iron Force Mains; 68 lin.ft. 6" Cast Iron Force Main in 14" Casing and 68 lin.ft. 12" Cast Iron Sewer in 42" Casing under Pennsylvania Railroad Tracks; 168 lin.ft. 12" Cast Iron Force Main under Marshyhope Creek; 165 lin.ft. 18" Cast Iron Outfall Sewer; 43 Standard Manholes (357 vert.ft.); 3 Dual Chamber Diversion Manholes; 50 MBM Timber Sheeting Left in Place; 5 MBM Creosoted Lumber in Foundation; 200 Tons Crushed Mineral Aggregate for Excavation and Refill Below Sub-grade; 85 cu. yds. Concrete for Jackets, Cradles, Blocking, etc.; 500 tons Crushed Mineral Aggregate for Temporary Repaving; 900 cu.yds. Select Material; 4550 sq.yds. Misc. Types Permanent Repaving; 105 sq.yds. Concrete Sidewalk Replacement; one Ejector-Type Underground Sewage Lift Station; two Standard-Type Pumping Stations; Sewage Treatment Plant (Complete), including Control Building, Vacuator System, Primary Clarifier-Flocculator, two Biofilters, Secondary Clarifier, Digester, Glass Covered and Open Sludge Beds, Chlorine Contact Tank, Equipment, Misc. Piping and Appurtenances (conveying water, sewage, and drainage on site); 1900 lin. ft. Untreated Timber Piling (76 Piles); 11,650 lin. ft. Creosoted Timber Piling (466 Piles); and Site Improvements at locations of Lift and Pumping Stations and Sewage Treatment Plant, including a total stated allowance of $2700 for Landscaping.

SCHEDULE B

2800 lin. ft. 6" Clay Pipe House Connections; 0.5 MBM Timber Sheeting Left in Place; 0.2 MBM Creosoted Lumber in Foundation; 140 tons Crushed Mineral Aggregate for Temporary Repaving; 100 cu. yds. Select Materials for Permanent Repaving; 815 sq. yds. Misc. Types of Permanent Repaving; 385 sq. yds. Sidewalk Replacement; 515 lin. ft. Concrete Combination Curb and Gutter Replacement; and two Sewage Metering Stations.

This project will be financed with funds furnished by the Mayor and Council of Federalsburg, together with Federal grants obtained under the provision of Public Law 660.

The attention of the bidders is directed to the Special Conditions covering this work which includes the Anti-Kickback Regulations issued by the Secretary of Labor (29 CFR, Part 3) and other special requirements.

Plans, specifications, and other contract documents may be examined at the Town Office located at 203 North Main Street in Federalsburg, Maryland, or may be obtained from the offices of Clarke Gardner and Percy Sterling, Consulting Engineers, Calvert and Bond Streets, Salisbury, Maryland, upon dposit of $50.00 for the initial set and $40.00 for each additional set. If the documents are returned in good order within thirty days after the opening of bids, the full amount of the original deposit for one set will be returned to each actual bidder. A refund of $10.00 will be made to non-bidders and subcontractors, or for each additional set of documents obtained by actual bidders.

Each bid must be accompanied by a properly prepared bid bond satisfactory to the Mayor and Council of Federalsburg in an amount not less than 5 per cent of the total bid of Schedules A and B.

Approved performance and payment bonds, each in the amount of 100 per cent of the contract as awarded, will be required from the successful bidder.

No bidder may withdraw his bid within 45 days after the actual date of the bid opening.

The Mayor and Council of Federalsburg reserves the right to consider informal any bid not prepared and submitted in accordance with the provisions of the contract documents and to waive any informalities in or reject any or all bids.

MAYOR AND COUNCIL OF FEDERALSBURG
JAMES A. SHAW, Mayor

Bids: See Advertisement

The Port of New York Authority

Sealed proposals for the following work will be received at the Office of the Chief Engineer, Room 1100, 111 Eighth Avenue, New York 11, New York, until 2:30 P.M. on date indicated, at which time said proposals will be opened and read in Room 1108.

Contract LGA-320.010—La Guardia Airport—Alterations to Drainage Structures—Deposit $30.00 per set of documents—Bids will be received until 2:30 P.M. on Thursday, November 2, 1961.

Contract BP-130.008—Brooklyn-Port Authority Piers—Demolition of Buildings at Summit and Conover Streets—No deposit required—Bids will be received until 2:30 P.M. on Thursday, October 26, 1961.

Contract EP-110.017—Elizabeth-Port Authority Piers—Berths 56 and 58 and Upland Areas—Paving and Utilities—Deposit $30.00 per set of documents—Bids will be received until 2:30 P.M. on Thursday, November 2, 1961.

Contract documents may be seen at the Office of the Assistant Chief Engineer for Design, Room 1115, 111 Eighth Avenue, New York 11, N. Y. Documents will be furnished upon receipt of the above deposit (each set including one copy of the Contract Drawings) for not more than three sets to any one company. Additional sets will be furnished upon payment of an amount for each set equal to the deposit indicated above, which payment is not returnable. Deposits and payments shall be delivered to the Treasury Department, Room 1001, where a receipt will be issued. The receipt shall be delivered to Room 1115, where the documents will be furnished.

Those who have submitted a bid on the contract directly to the Authority will receive a refund of the deposit for each set of documents, not exceeding three, returned within forty days after the opening of proposals. Those who have submitted a bid will receive a refund of one-half of the deposit for each set of documents, not exceeding three returned within forty days after the opening of proposals.

THE PORT OF NEW YORK AUTHORITY
S. Sloan Colt, Chairman

New York, October 12, 1961

U. S. Government

DEPARTMENT OF THE INTERIOR, Bureau of Reclamation. Sealed bids (Invitation No. DS-5678) will be received at Denver, Colorado, until 2 p.m., Mountain Standard Time, November 21, 1961, for furnishing (32) special transmission line structures, 8 types as follows: 4 types of guyed steel V-frame and H-frame, having legs of box truss and tubular cross-section; 2 types of guyed aluminum V-frame and H-frame, having legs of box truss cross-section; and 2 types of aluminum self-supporting towers, having structural members either tubular or other extruded shapes for Glen Canyon-Shiprock 230 Kilovolt Transmission Line, Colorado River Storage Project, Arizona-New Mexico. Delivery is desired within 200 days. For Particulars, address Bureau of Reclamation, Building 53, Denver Federal Center, Denver 25, Colorado. Floyd E. Dominy, Commissioner.

DEPARTMENT OF THE INTERIOR, Bureau of Reclamation. Sealed bids (Specifications No. DC-5680) will be received at Huron, South Dakota, until 10 a.m., Central Standard Time, November 14, 1961, for furnishing labor and materials for Rapid City-Newell-Maurine 115-kilovolt Transmission Line, Transmission Division, Missouri River Basin Project. Location in Pennington, Meade and Butte Counties, South Dakota. Principal items are 717 structures—Furnishing and constructing various types of structures with maximum pole lengths from 50 to 85 feet; 88 miles of line—Furnishing and stringing three 477,000 circular-mil ACSR 24/7 conductors; and other work. Completion time 190 days. For particulars, address Bureau of Reclamation, P. O. Box 2553, Billings, Montana; P. O. Box 825, Huron, South Dakota; or Building 53, Denver Federal Center, Denver 25, Colorado. Floyd E. Dominy, Commissioner.

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OFFICIAL PROPOSALS

Bids: November 1, 1961

Triborough Bridge and Tunnel Authority

SEALED BIDS WILL BE RECEIVED BY Triborough Bridge and Tunnel Authority at its office, Administration Building, Randall's Island, Manhattan, New York 35, New York, as follows:
Until 11 A.M. Wednesday, November 1, 1961

For Narrows Bridge Contract No. NB-11, Staten Island Approach and Plaza, Staten Island, New York City. The bid must be accompanied by a deposit in the amount of $250,000.00.

The contract includes grading, drainage, concrete and steel structures and paving.

Plans, specifications and contract documents may be purchased at the office of the Authority for $100.00 which will not be refunded.

U. S. Government

Sealed bids will be received in the office of the Engineering and Construction Director, Panama Canal Company, Balboa Heights, Canal Zone, under reference PC 62-12, until November 8, 1961, and will at that time be publicly opened, for the furnishing of two distillate and residual oil fired gas turbogenerators, residual oil treating plant, and all electrical and mechanical equipment required for a complete power generating station. Each unit will be approximately 10,000 KW. Plans and specifications are available for examination at Panama Canal Company, New Orleans Army Terminal, Building 3, Floor 5, New Orleans, Louisiana. Complete sets of data may be obtained upon payment of $25 deposit. For further information, contact this office. Telephone New Orleans 947-4595, Area Code 504.

Sealed bids will be received in the office of the Engineering and Construction Director, Panama Canal Company, Balboa Heights, Canal Zone, under reference PC 62-13, until November 1, 1961, and will at that time be publicly opened, for furnishing and installing a central water chilling plant and a chilled water distribution system. Plant to be four 1000 HP centrifugal compressors, three chilled water pumps, cooling tower, all necessary piping, electronic controls, ventilation, and a 5750 KVA electrical substation. Distribution system consists of underground insulating piping system (3000 ft. of 18-inch pipe and 17,000 ft. of 20-inch pipe). Plans and specifications are available for examination at Panama Canal Company, New Orleans Army Terminal, Building 3, Floor 5, New Orleans, Louisiana. Complete sets of data may be obtained upon payment of $50 deposit. For further information, contact this office. Telephone New Orleans 947-4595, Area Code 504.

Sealed bids will be received in the office of the Engineering and Construction Director, Panama Canal Company, Balboa Heights, Canal Zone, under reference PC62-11, until November 1, 1961, and will at that time be publicly opened, for the construction of 145 apartments in the Pacific side of the Canal Zone. The work also includes the furnishing of all systems, such as sanitary sewer, water, telephone, electrical distribution, as well as grading, sidewalks, and landscaping. Plans and specifications are available for examination at Panama Canal Company, Building 3, Floor 5, New Orleans Army Terminal, New Orleans, Louisiana. Complete sets of data may be obtained upon payment of a $50 deposit. For further information contact this office or telephone New Orleans 947-4595, Area Code 504.

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• POSITIONS VACANT

Structural Engineer-Midwest consulting firm seeks Ph.D. to design complex steel structures, reinforced and prestressed concrete. Preference will be given to applicants with practical experience. Permanent position with established firm in business since 1929. Moving expenses paid. Send resume, including education, experience, and personal qualifications to P-6245, Engineering News-Record.

Sanitary Engineer. Opportunity to assume overall supervision and client contact on sanitary projects for long-established midwestern consulting engineering firm. Experience in all phases of sanitary work is desired. Send complete resume of experience and qualifications. Replies held in strictest confidence. Our employees know of this advertisement. P-7178, Engineering News-Record.

Estimator—Approximately 10 years of estimating experience in commercial and industrial building construction required. Excellent opportunity for a permanent position with an established medium-sized contractor in North-Central Connecticut. Please state availability, education and salary required. P-7582, Engineering News-Record.

Sewer Estimator—Engineer—C.E. graduate with desire to become part of aggressive and growing construction firm specializing in sewers. Location: Iowa. Prefer Registered P.E. Send complete resume of education, experience and qualifications including salary expected to Stanfield-Pyland Construction Co., 5731 Urbandale Avenue, Des Moines 10, Iowa.

Estimator for General Contractor in heavy commercial, industrial and paving projects. Must be top notch man in take-off, change orders, etc. Excellent opportunity with one of country's leading contractors. Chicago area. Give resume. P-7574, Engineering News-Record.

Civil Engineer, min. 5 yrs irrigation and/or hydroelectric experience. Overseas assignment with expanding consulting firm. Send resume and salary desired. P-7577, Engineering News-Record.

Permanent openings for Resident Engineers experienced in supervision of construction of large steam power plants and/or high-voltage transmission lines. Degree and registration desirable. Excellent opportunity with consulting engineering firm. Please send resume of education and experience to P-7228, Engineering News-Record.

Graduate Engineer with at least 1 year experience in electronic computer programming and/or application for Computer Section of large consulting engineering firm presently using Bendix G-15 Computer. Permanent employment with liberal benefit program. Reply with resume to Stanley Engineering Company, Muscatine, Iowa.

Estimator, Construction: Must be thoroughly experienced in quantity survey work for commercial and government buildings. Pricing knowledge not required. Good opportunity with progressive expanding organization. Forward qualifications and references to: Blake Construction Co., Inc., 1120 Connecticut Avenue, N. W., Washington, D. C.

• POSITIONS VACANT

Wanted—Civil Engineer—Capable of designing storm sewers, paving, planning, inspection and miscellaneous other county work. Minimum 5 years experience in county highway or municipal work. College graduate or equivalent. Send resume and state salary required. Apply—Personnel Assistant, Anne Arundel County Commissioners Courthouse, Annapolis, Maryland.

Civil Engineer, minimum three years experience in municipal engineering and general civil engineering. For a position with municipal public agency. Desire some structural background. Salary to $8,300. Location Southern New England. Submit resume to P-7600, Engineering News-Record.

Carpenter Superintendent for Dam Construction (150,000 CY). Must be young and aggressive. S.O.G. of Texas, P. O. Box 3026, Waco, Texas.

Registered structural engineer for national structural steel fabricating firm located in Southern California. Permanent position with good possibility of advancement. Send resume, salary expected, references and availability to P-7511, Engineering News-Record.

Sanitary Engineer with 3 to 10 years experience in preliminary studies and/or design of sanitary projects. Long-established consulting engineering firm offers permanent employment with opportunity for advancement. Please submit resume of education, experience and salary requirements to P-7363, Engineering News-Record.

Electrical Engineer—Experienced in design of electric transmission, distribution and substation facilities. Progressive consulting engineering firm offers permanent employment with opportunity for personal development and advancement potential. Submit resume and salary requirements to Stanley Engineering Company, Muscatine, Iowa.

Field Engineer — Permanent position with established Midwest consulting firm for man thoroughly qualified and experienced in all branches of building construction. Moving expenses paid. Electrical or process engineer preferred. Send complete resume to P-7633, Engineering News-Record.

(Continued on opposite page)

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• POSITIONS VACANT
(Continued from opposite page)

Guard Rail Superintendent. Must be familiar with all phases of guard rail construction and be able to procure and train capable foremen and operators. Send complete resume including salary requirements to P-7614, Engineering News-Record.

Assistant Supt. Public Works—Town of Lexington, Mass., pop. 28,000, C.E. exper. including municipal public works water and sewer systems. Starting salary $6500. Apply Supt. Public Works, Town Offices, Lexington, Mass.

Highway Engineer — Automobile Club of Southern California, Los Angeles. U.S. citizen. Registered C.E. with experience in street, road or highway engineering. Under 40. Salary open—depending on experience. Promote improved street and highway transportation at all levels of government. Support and serve in advisory capacity to traffic and highway agencies. Participate in broad variety of related activities involving urban transportation, freeway design and operation, highway financing and legislation, report writing, speaking engagements, committee and professional society work. Some research. Professional advancement. Apply: John W. McDonald, Director of Engineering, 2601 S. Figueron Street, Los Angeles 54.

Engineering Teacher — Mechanics, General Engineering Drawing, Surveying teacher needed in strong comprehensive junior college. Salary range from $5,500 to $9,700. Apply to Dr. William C. French, Superintendent, Joliet Junior College, Joliet, Illinois.

Civil engineering graduate, preferably registered, for permanent position with Town of Ocean City, Maryland. Salary open. Send resume to Mayor and City Council, Box 222, Ocean City, Maryland.

Sanitary Engineer—Opportunity to develop sanitary div. for long est. 100 man engr. firm incl. promotion, client relations and direction of design and constr. H. W. Lochner, 20 North Wacker Dr., Chicago, Ill.

Highway Engineers—Upstate N. Y. Consulting Engineer seeks Senior Engineer with B.S.C.E., min. 5 yrs. exp. including supervision at project level; and Junior Engineers with B.S.C.E. or equivalent and 2 yrs. experience in design of Interstate projects. Permanent position, excellent benefits. Send complete resume and salary requirements to P-7640, Engineering News-Record.

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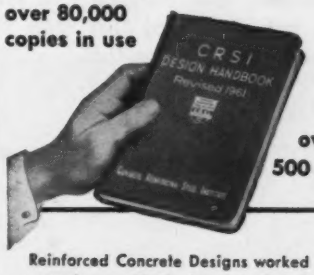

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DESTRUCTIVE FIRES in 1960 set all kinds of new and dismal records. The National Fire Protection Association has just announced that more than $1.5 billion went up in smoke last year; that fires claimed over 11,000 lives; and the number of fires reached a record total of 2,124,000.

More dwellings than ever were destroyed—563,000—and the resulting deaths exceeded 6,000. There was less loss of life in public schools last year, but damage in college and other educational structures rose sharply.

These statistics are particularly valuable in limelighting the types of structures most vulnerable to fire. But even more important, the NFPA's facts and figures should make architects and engineers more conscious than ever of their responsibility to make all types of structures fire-safe.

New Wastes Research Needed

FEDERAL ACTIVITY IN WATER POLLUTION CONTROL is an established fact of life and, regardless of the program's merits, the record shows that with it we are holding our own against the rising tide of traditional pollution (ENR Oct. 5, p. 21). But that may not be enough, considering the changing nature of pollutants.

Most sewage treatment methods date back 50 years or more. They were developed for organic municipal and industrial wastes of types that still comprise most of our man-made pollution. The huge volume of untreated or poorly treated wastes of this type still presents an excellent reason for further intensified application of these methods. But we must keep abreast of changes too.

Nearly every scientific advance produces new and exotic pollutants that get into streams and groundwater. Household detergents find their way back into water supply sources. Agricultural drainage leaches new types of pollutants out of herbicides, pesticides and fertilizers. Rainwater and drainage of any area may contain radioactive particles.

What to do about these new wastes—even how to find cheaper ways of treating traditional wastes—these will remain unanswered questions until much stronger research than is now in sight is undertaken. Hopefully, this is an area where government aid and activity would encounter less opposition than it does on construction grants for sewage treatment. Moreover, it would seem logical for waste treatment research to be pressed with an enthusiasm at least comparable to that in saline water conversion, since waste water re-use offers far more advantages in the opinion of many experts.

The fact is that the new saline water research and development program has two and half times as much money available as the new federal waste treatment research program—$12.5 million a year compared with $5 million. It may be true that this $5 million for waste treatment research is a real step forward, and it may insure some gains in the battle against traditional pollution. But it is sadly inadequate for a campaign against the new forms of pollution. Waste treatment research is at least as important as research in saline water conversion. It will gain very little if saline waters are converted to fresh only to be polluted beyond optimum usability by unmanageable wastes. To avert this possibility a better balance between research efforts in these two fields will be required.

Automatic Paver Controls

THE DEVELOPMENT OF AN AUTOMATIC GRADE CONTROL for asphalt screeds (see p. 57) represents a major breakthrough in the never ending struggle for better roads at lower costs. Eliminating the need for manual adjustments of the screeds makes it possible to lay more pavement in a faster time, and with a greater degree of accuracy than heretofore possible.

This much being said, it must also be noted, however, that like all new devices certain problems remain to be solved before maximum usefulness can be realized. There are at least two such problems that block smooth sailing for the paver screed control. One relates to a detail of the control, the other to highway specifications.

As to the control design, there would seem to be room for improvement in the sensor guide device. It is difficult to imagine that a tight string or wire is the most desirable reference for pavement elevation. The need for establishing grades and installing supports at intervals of 50 ft or less, and the certainty of line sag, no matter how slight, are among the disadvantages of the present system which should—and undoubtedly will—be eliminated.

But improvement of the control system is only part of the picture. If the unit were perfect right now, its effectiveness would be greatly hampered in many states where highway department specifications limit paver speeds—in some cases to as little as 32 ft per minute.

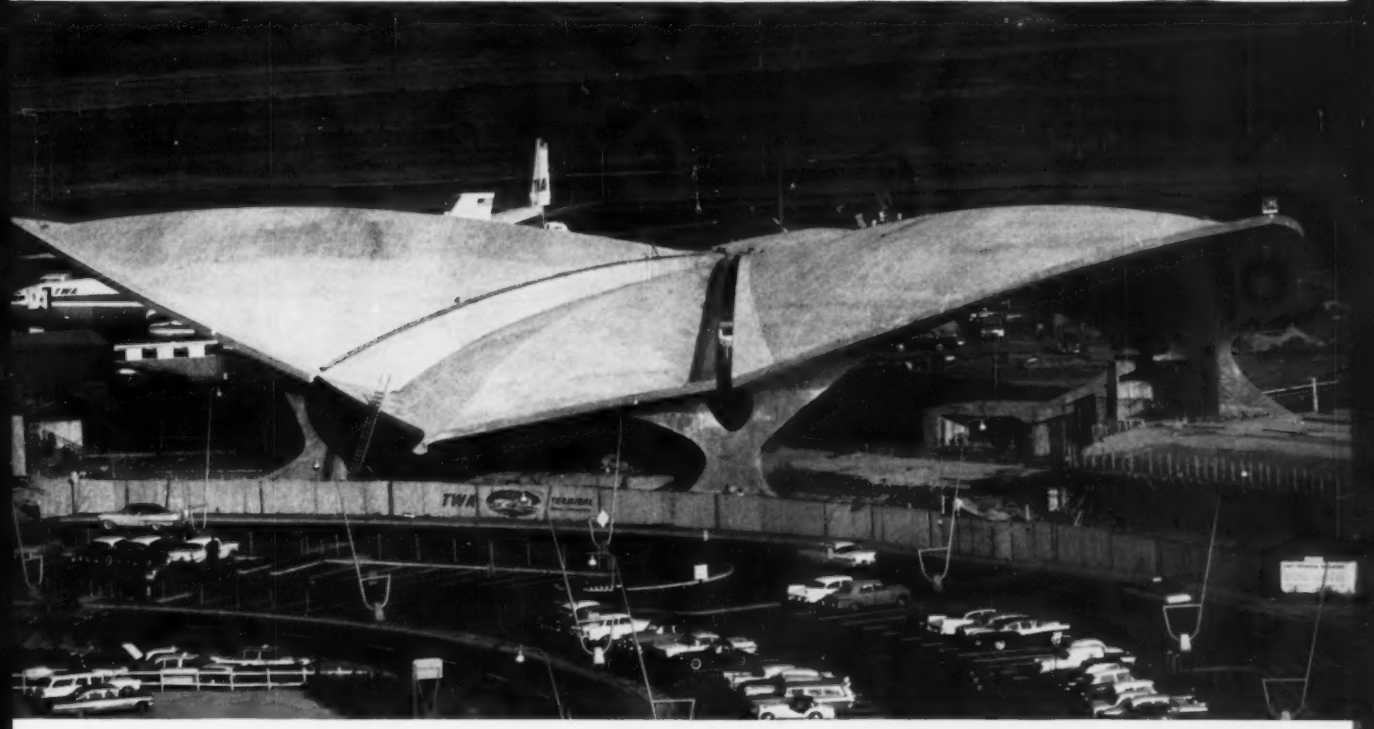
There is undoubtedly a sound basis for restricting paver speed when the skill and reaction time of an operator are factors in determining pavement quality and smoothness. With automatic controls, though, no such reason for restricting production would be present. In evaluating the potential of automatic paver controls, highway departments will have to take into account revisions of their pavement placing specifications.

Development of these automatic paver controls, important in itself, is indicative of the challenging possibilities for improvements that exist on all types of construction equipment. It lends hope that more of the new knowledge of this scientific age will be applied to the machines of construction.

"We couldn't have placed this kind of concrete without POZZOLITH"

Report on precise set control at new TWA terminal

KENNETH P. MORRIS, Field Project Manager
Grove, Shepherd, Wilson & Kruge, Inc., New York City.



"This TWA project is the biggest challenge to concrete men I've seen in 30 years. The massive concrete roof shell is an arch cantilever design—thickness ranging from 8" at the edges to 44" at the centerplate. Each of the four lightweight concrete shells had to be a continuous monolithic section and the complex roof geometry required counterforms to hold concrete on the steep slopes during initial set.

"The critical part was *timing* the removal of counterforms to allow finishing to the final architectural contours. The key to that problem was precise set control of the concrete.

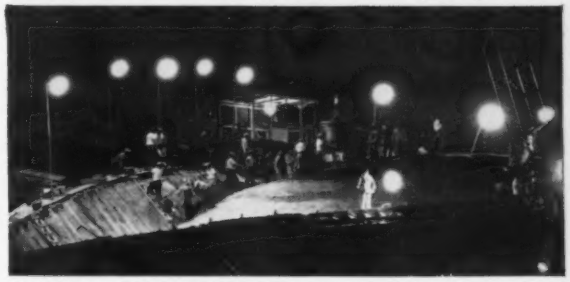
"The design mix for the Norlite lightweight aggregate called for 7¾ sacks of cement with 7" slump for an ultimate strength of 4000 psi. Our final mix for the job was designed with 6½ sacks and POZZOLITH. We used 5" slump under the counterforms and 3" slump outside. POZZOLITH gave us remarkable set control . . . the *precise set* we wanted, anywhere in the range of one-to-four hours. The concrete finished easily with good texture, no plastic cracking and low shrinkage. And it tested at over 5000 psi.

"Credit goes to the effective set control system worked out with Master Builders. At our two batching stations, POZZOLITH was added to produce the precise set needed for each individual load of concrete. Stations got their instructions by walkie-talkie from the concreting superintendent on the roof.

"The teamwork between our men, the supervising architect, engineers, test lab, ready-mix men and the Master Builders field men was the finest we've ever seen . . . and that 6000 tons of sculptured concrete you see standing there is the best proof I know."

For lowest cost-in-place, superior quality concrete–there's no equal to POZZOLITH. Call in the local Master Builders field man to demonstrate how POZZOLITH can help put you ahead on your current job.

NEW TRANS WORLD AIRLINES UNIT TERMINAL, Idlewild Airport, New York. Two-and-a-half year project scheduled for completion in late 1961. Four roof shells weigh 6000 tons, contain 3200 cu. yd. POZZOLITH concrete and 500 tons steel over a 50,000 sq. ft. area.



ROUND-THE-CLOCK CONCRETING of roof shells took from 24 to 30 hours per shell. Three 180-foot cranes hoisted half-yard concrete buckets to pre-planned locations. TWA Project • Architect: Eero Saarinen & Associates • Supervising Resident Architect: Ralph Yeakel • Consulting Engineers: Ammann & Whitney—Boyd G. Anderson, Senior Partner in Charge • General Contractor: Grove, Shepherd, Wilson & Kruge, Inc. • Testing: Haller Testing Laboratories, Inc. • Ready-Mix Concrete: Transit Mix Concrete Corp.

The Master Builders Company • Cleveland 18, Ohio
Division of American-Marietta Co.
World-wide manufacturing and service facilities

MASTER BUILDERS. POZZOLITH*

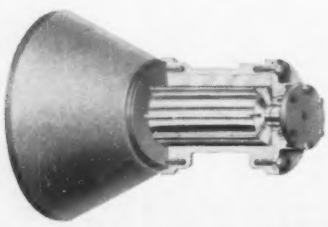
*POZZOLITH *is a registered trademark of The Master Builders Co. for its ingredient for concrete which provides maximum water reduction, controls rate of hardening and increases durability.*

MONO-ROTOR PROVEN...WARRANTY QUADRUPLED

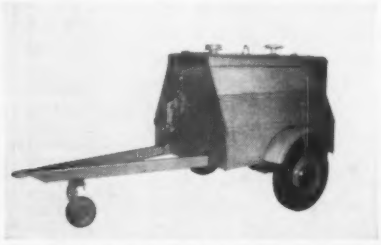
The new line of Worthington Mono-Rotor compressors has gained extensive field experience with outstanding success. Performance has been so successful, in fact, that Worthington has lengthened its warranty period from 3 months to one year. It is the first major construction industry compressor manufacturer to do so.

Mono-Rotor units have proven themselves in widespread areas over the last 3 years. They are in locations ranging from New York City to Hawaii—from Alaska to Argentina. Service conditions have ranged from the intermittent use in winter and summer to three-shift use for months at a time.

What makes the Mono-Rotor compressor so dependable? It is extreme simplicity.



MONO-ROTOR: 1 STAGE... 1 ROTOR... 2 BEARINGS... NO GEARS... NO OIL PUMP



NEW 125′ MONO-ROTOR BLUE BRUTE

It actually has 63% less parts than its two-stage predecessor. The Mono-Rotor has just one stage, one rotor, two bearings, no gears and no oil pump. No other compressor design is so simple.

The new Worthington Mono-Rotor compressors have other benefits, too. They are 20% lighter in weight and are designed for improved towing and tracking. The 3rd wheel is standard equipment for easier handling on the job. It runs all day on a tank of fuel. There's an engine-saving clutch and many other features.

The Mono-Rotor can now be ordered in the 85′, 125′ and 250′ sizes. See it . . . rent it . . . or buy it at your Worthington dealer listed in the Yellow Pages under "compressors". Or write Worthington Corporation, Dept. 60-39, Holyoke, Mass. In Canada, Worthington (Canada) Ltd., Brantford, Ontario.

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